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BLUE JAY

September 1982

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Cover: *Sandhill Cranes.* *Ken Lumbis*

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FAULTY ISSUES

It has been brought to our attention that some of the December 1981 issues were defective in that pages were missing or were entered in incorrect order. If you received one of these faulty issues and would like a replacement send your old one to the editor at Box 414, Raymore, Saskatchewan. S0A 3J0

BEAUTY AND THE BOTANIST*

STAN ROWE, Department of Plant Ecology, University of Saskatchewan,
Saskatoon, Saskatchewan. S7N 0W0

Athabasca sand dunes. *Stan Rowe*

The south shore of Lake Athabasca has been named one of four exceptional areas in Saskatchewan that ought to be preserved, yet action toward this end has been repeatedly deferred. Why so? Most of us have heard again and again the logical reasons for preserving at east some viable parts of the non-humanized natural landscape; reasons that tend to be economic and utilitarian, showing how the human race will benefit n the long run. Mostly the logic fails just because of its dependence on utility. Developers, business men, politicians, people in general, perceive that the *comparative utility* of wilderness, of wild animals and plants, is small. Hence, as an example, dedication of the Grassland National Park in southern Saskatchewan awaits proof that the land is valueless for the production of such non-renewables as natural gas and oil.

It seems to me, therefore, that the battle for preservation will be won, if it can be won, in the arena of non-utilitarian values, to which no price-tag is attached.

This article is abstracted from a talk given by Dr. Rowe to a joint meeting of the Canadian Botanical Association and the Canadian Society of Plant Physiologists, held at Regina in June 1982.

It is time to state the case for the beauty of landscape as a real value, rather than accenting only the case for benchmark sites, gene pools, potentially useful crop plants, and pharmaceuticals. It is time to champion the aesthetic sense and put some trust in it, rather than relying on the economic sense that calculates only market profits and discounts the future.

What has the professional biologist to do with beauty? Not nearly enough! In the kind of science currently practiced, a conscious effort is made to exclude considerations of beauty and such emotive values from the subject matter and from personal attitudes for two reasons:

1) Because the scientist studies phenomena that can be quantified, searching for mechanisms within and not for aesthetic emanations without, and
2) because aesthetic feelings might distract from the necessary methodology; if the technique is dissection, then it is profitless to ask if the living whole might not be more beautiful than the dead parts.

The danger is that the methodology, and the world view that is consistent with it, erodes and may in time eradicate those non-utilitarian instincts that I believe we must trust and rely on if there is to be preservation of natural areas.

Let me emphasize the point. Reading the abstracts of the papers at this botanical conference I found no titles such as "The beauty of the flower," "The aesthetics of riparian vegetation," "Sensory delight in the study of organelles." Why? Because beauty is not a part of science's content. Science has naught to do with the qualitative aspects of emotions and feelings. This would not be a bad thing were scientists able to retain a lively sense of what is missing.

Unfortunately the rational mind has a failing: if it cannot cope with certain aspects of experience, it declares them meaningless and unimportant; they are, says the intellect, unsubstantial epiphenomena. Thus there is a widespread distrust of emotions and their promptings because no white-coated savant has corked the incontrovertible evidence of them in a test tube. The better humanity becomes at science and the development of intellect, the less room there is for feelings and things of the spirit. Values still call the shots, but the value system is debased. Eventually it comprises only those precepts that can live with science and that science can live with. "Truth" is one such precept, but truth-in-science is a peculiarly denatured form of the rea thing.

Galileo is one of the heroes o science, and the story of his persecution by the Church is legendary. Time has acquitted him of the Inquisition's charge that he blasphemed in rejecting the Ptolemaic of the Copernican system o planetary motions. But Galileo did commit a real crime; one for which he was never tried. That crime was the rejection of *total* human experience; for he divided experienced reality into an objective quantifiable sphere — the real world, the world of science — and a subjective qualitative sphere of feeling and meaning which he dismissed as unimportant By so doing he discarded half the mind and set us on the road to becoming one-eyed monsters. Because from then to the present the world's heavy thinker have insisted that nature speaks only th language of quantity, of mathematics which is to say that nature i mechanistic. Nature doesn't spea human, it speaks machine. In this century the philosopher and mathematicia Alfred North Whitehead revolted agains the mainstream, characterizing th domination of thought by scientifi materialism as "One-eyed reason deficient in its vision of depth."

In our day scientific materialism ha completely taken over western consciousness, despite formidable op position every step of the way. Is it because those who objected to the separation of intellect from sensitivity, of thought from feeling, were *merely* poets and philosophers, people like Blake and Wordsworth, Rousseau and Thoreau? Surely the pen is mighty, and good ideas ought to win out? Well, it seems that scientific materialism has won because at this time in history people value power and control over the material universe above all else. And it is power and control over material things that intellect, through science, delivers in spades.

Don't misunderstand me; this is not an attack on science. It *is* an attack on the belief that the pursuit of science is the only important human endeavour, or even *the most important* endeavour of intelligent people. Maybe those who don't take up science, sense in a deep way, that functional rationality leaves out too much of what is real and vital in their lives.

Each of us has to believe in something. Personal satisfaction requires a caring for something beyond ourselves. Organized religion used to fill the bill, but society has become more and more secular in the last few hundred years. What is there today for idealistic young people if they reject the hypocrisy of the commercial world? Often they turn to science that also promises selfless service to humanity: progress, freedom, a better world. Thus science has become a religion not lacking in dogma and replete with Latin maxims. "Quaecumque Vera", "Whatsoever things are True," is the motto of my Alma Mater. It sounds good; but now we know, thanks to such philosophers of science as Kuhn, that "truth" only means correspondence with the latest heory. Such truth has little relevance to making our society decent and our world livable. Surely this is not the truth o which the poet referred in the lines: 'Beauty is truth, truth beauty, — that is all ye know on earth and all ye need to know."

It is no accident that the older buildings on our campuses resemble cathedrals, gothic-arched and stone-pinnacled. They were erected as temples to knowledge, to the new religion: "Ye shall know the truth and the truth will make you free." As the dream faded, so the architecture declined. The latest buildings on many campuses are plain ugly, and these latter day monuments are telling us something about universities.

Remember Einstein's words honoring Max Planck in 1918, back in the golden age of universities:

> "In the temple of science are many mansions, and various indeed are they that dwell therein and the motives that have led them thither. Many take to science out of a joyful sense of superior intellectual power; science is their own special sport to which they look for vivid experience and the satisfaction of ambition; many others are to be found in the temple who have offered the products of their brains on this altar for purely utilitarian purposes. Were an angel of the Lord to come and drive all the people belonging to these two categories out of the temple, the assemblage would be seriously depleted, but there would still be some men, of both present and past times, left inside. Our Planck is one of them, and that is why we love him."

Notice the imagery in the temple of science, and Einstein's idea of a dedicated, unselfish, priestly elite leading humanity forward. In 1941, 23 years later, a more pessimistic Einstein wrote of science:

> "Whatever this tool in the hand of man will produce depends entirely on the nature of the goals alive in this mankind. Once these goals exist, the scientific method furnishes means to realize them. Yet *it* cannot furnish the very goals . . . Perfection of means and confusion of goals seem — in my opinion — to characterize our age."

So Einstein came to believe that

science is instrumental; science is a tool, a means. Science, he is saying, is great if you know where you want to go with it, if you know where you want it to take you. But left to itself, setting its own expedient goals, the odds are that it will do as much harm as good. Nevertheless, every scientist worth her/his salt will argue that scientists should be given a bundle of money by NSERC and then should be left alone to do her/his thing! Ah but, some may say, you are failing to distinguish between *our* curiosity-oriented, impersonal, clean science and *their* regrettable, misused, applied technology. Let's stop kidding ourselves; the two are not separable.

Thus we are brought back to the question of guiding values; back to sensibilities such as beauty, and to faith that the feeling parts of consciousness, in addition to intellect, have worth to set leading goals. The temples of our campuses need to be rededicated, but to what?

Fortunately there is an attractive faith with ancient roots; a faith that makes ecological sense. Many peoples at

Aspen leaves.

Gary W. Seil

various times and places in history have thought of humanity and the world as one. Apparently the Greeks had this organic view of nature and of their place in it. A recent restatement is by James Lovelock; he calls it the *Gaia Hypothesis*. Gaia, you remember, was the goddess of the Earth, and Lovelock wants to put the earth, not humanity, at the vital center. Humanity is likened to Antaeus, son of Gaia, who retained his strength as long as he was in close touch with mother earth. Whatever separates humanity from its roots in the earth — present day Herculean technology, for example — saps health and wholeness. (In the myth, Hercules overcame Anateus by holding him aloft, so that he could not touch the earth.)

Acceptance of the Gaia Hypothesis requires another Copernican revolution. The world does not revolve around people, but we revolve (and evolve) around the earth which is the source of life and of creativity. Were this our human faith, we might look to the future with some optimism. For then science could be guided in a healthy direction. Humanity could harness its intellectual powers to rescue the earth; to rehabilitate and maintain its beauty, its permanence and productivity. A chief goal would be the reconciliation of mankind with the earth, giving up the death-wish science and technology that currently employs half the world's scientists.

This is the direction that beauty perceived in nature moves us. Beauty, I believe, is trying to tell us something of relatedness, of interconnectedness, of health and wholeness.

The currently popular divided brain hypothesis, the concept of the bicameral mind, provides a rationale based on neuropsychology that allows us — brainwashed as we all are by scientific materialism — to accept without discomfort what we have always known by introspection; namely, that mind has an intuitive side, a feeling side, a holistic side, in addition to intellect. If half the brain is devoted to sensibilities such as beauty, perhaps we can accept the importance of this aspect of experience.

No one knows what beauty is. Artists and poets try to create it, and philosophers often say something about beauty which is instructive. Spinoza said that beauty is the perception of what is healthy (and the word "health" has its root in "whole", in wholeness). Kant thought that beauty had to do with unity of structure, with the completedness of design (note again the idea of wholeness), and he added that an interest in the beauty of nature for its own sake is always a sign of goodness. Schopenhauer thought beauty to be the ultimate good; the ultimate joy, he said, is in creating or cherishing the beautiful. A modern thinker, Gregory Bateson, says that the aesthetic sense responds to the *pattern that connects all things*. So there seems to be agreement that beauty has strong ties with wholeness, health, holism, holiness.

The poet Robinson Jeffers wrote these appropriate lines:

> A severed hand is an ugly thing,
> And man dissevered from the earth and
>   stars and his history . . . for contemplation or in fact . . . often appears
>   atrociously ugly.
> Integrity is wholeness,
> The greatest beauty is organic wholeness,
> The wholeness of life and things, the divine
>   beauty of the universe.
> Love that, not man apart from that,
> Or else you will share man's pitiful confusions,
> Or drown in despair when his days darken.

These sensitive poets and philosophers have felt intuitively the transforming power of beauty. Remember the fairy tale "Beauty and the Beast?" In that allegory Beauty rescued and transformed the Beast, and not by the logic of science.

PLANT FINDS IN SASKATCHEWAN, 1980 AND 1981

JOHN H. HUDSON, 323 Maple St., Saskatoon, Saskatchewan. S7J 0A6

Despite the title, I found no plant records really worth writing about in 1980. However, 1981 was more fruitful. This season was highlighted for me by the discovery of Sand Puffs or Sand Verbena (*Abronia micrantha* (Hook) Torr.) just within the limits of Saskatchewan.

Hope Johnston gave us in 1975 the story of her rediscovery of this plant on loose sand in the valley of the South Saskatchewan River, some 15 mi downstream from Medicine Hat.[3] A lifelike drawing was given therein, so that I need give little description of Sand Puffs other than to say that the fruiting plant looks like Sand Dock (*Rumex venosus*) but it is an annual with opposite leaves. Reading the description of its habitat in the Johnston article set me thinking how one would go about finding Sand Puffs in Saskatchewan. Evidently it requires loose sand under conditions as hot as possible, so one should look:

(1) As high up the South Saskatchewan River as possible, to be nearest the known Alberta stations; (2) in generally sandy country; (3) deep down in the valley to find a hot

South Saskatchewan River looking north, around the curve of the hill from the Sand Puffs site.

John Hudso

microclimate; (4) on the inner or convex side of a bend of the river, and therefore on the slip-off slope where the soil would be alluvially deposited sand.

These requirements are met by a little bit of Saskatchewan s. of Empress, Alberta in sections 5, 6, 7 and 8 in 22-29-W 3rd, where the South Saskatchewan River bends into Saskatchewan and out again before returning to Saskatchewan to join the Red Deer River.

Study of maps followed by a preliminary scouting on 21 June showed that the nearest one could get to this tract of land by car was a point 1.5 mi east of Alberta Highway No. 41, 3.5 mi from the Saskatchewan boundary. So on 11 July I drove there, loaded a shoulder bag with lunch, a map, and assorted tins of juice, and set out to walk the distance, some 5 mi out and 5 mi back. The country was trackless sandy prairie; one could estimate where one was only from one's watch and an assumed speed of 3 mph. Except for aircraft overhead, the landscape was just as it was before settlement — it wasn't even overgrazed. An antelope inspected me from a viewpoint atop a sandhill.

When I arrived at the river breaks, a eer was drinking from the river in broad aylight. A search of the loose sandy lopes soon turned up Sand Puffs at a oint about 70 feet above the water. It as a little surprising how soon I found it fter arriving at a theoretically suitable lace. I also noted with interest how ripe e plants were by 11 July, but recalled at Johnston had described its life ycle as that of a desert ephemeral. he 3-winged fruits are a trifle smaller nd less red than those of Sand Dock, ut are wholly similar in form. The fruits the two species are plainly evolved in arallel for dispersal by rolling before e gusty winds of sand dunes.

I got back to the car at sunset conventionally tired but happy. More exactly, I was used up, with intervertebral disks flattened so that a step down the slightest drop jolted all along the spine, but with a coating of that self-satisfaction which comes from accomplishing what one set out to do and seeing one's theories working out in fact.

Collection data are: *Abronia micrantha* (Hook) Torr., Hudson 4152, 11 July 1981, L.S.D. 11 in 5-22-29 W 3rd, steep sloping cutbank of loose sand.

Some other records from the hot inner valley of the South Saskatchewan River in the Empress area (Saskatchewan side) may also be given. Least Cryptanthe (*Cryptantha minima* Rydb). Hudson 4151, 21 June 1981, Empress, L.S.D. 1 in 9-23-29 W 3rd, dry sandy south facing slope in ravine. This small Crypthanthe had been collected by myself (Harms & Hudson 1978) from the yard of an abandoned elevator at Westerham. No. 4151 is from a more natural, though unstable, habitat.

Stinking Goosefoot (*Chenopodium dacoticum* Standley). Hudson 4149, 21 June 1981, Empress, L.S.D. 1 in 9-23-29 W 3rd, arid silty soil on valley bottom; Hudson 4159, 12 July 1981, Empress, L.S.D. 16 in 4-23-29 W 3rd, arid silty bench in ravine. This small goosefoot with white-mealy more or less circular leaves may be separated from all other *Chenopodia* (goosefoots) by its odor of dead fish, caused by amines, which may be perceived even in dried material. It is found in Saskatchewan only in hot microclimates within the inner valleys of the South Saskatchewan and Frenchman rivers. It has gone under the alternate name of *C. watsonii* A. Nels. but Maher et al seem to have finally settled on *C. dacoticum*.[4] They report it from Ravenscrag, Lancer Ferry, and Kyle.

These three species of desert or at least hot arid conditions are at the northeast edge of their ranges and thus are found only in the sheltered lower benches of deep valleys where the requisite hot summer microclimates exist. Particularly for Stinking Goosefoot was it possible to observe that it couldn't be found at all on the high ground at prairie level, even on suitably dry soil. Nodding Umbrella Plant (*Eriogonum cernuum*) recorded by Maher et al for Lancer Ferry and Webb — also collected by me on these Empress forays as No. 4150 and No. 4154 — has similar habitat needs.[4]

One more record of interest for Saskatchewan, is the finding of a second station for Hairy Prairie Clover (*Petalostemon villosum* Nutt.), southwest of Dundurn. Breitung reported it as new to Saskatchewan 23 years ago, based on a collection of mine from the Caron area.[1] Details of the Dundurn collections run thus: Hudson 4165, 17 July 1981, Dundurn, about L.S.D. 15 in 10-32-6 W 3rd, loose sand east side of sand dune; Hudson 4178, 14 August 1981, Proctor Lake, about L.S.D. 8 in 7-32-5 W 3rd, semi-stabilized blowout. It seems to be confined to at least semi-moving sand blowouts. Some years earlier I had seen in the Fraser Herbarium, University of Saskatchewan, an unmounted student collection of this Hairy Prairie Clover marked only "Dundurn" for locality, so I knew there was some likelihood of locating colonies of this attractive plant if one made enough forays into the Dundurn Sandhills.

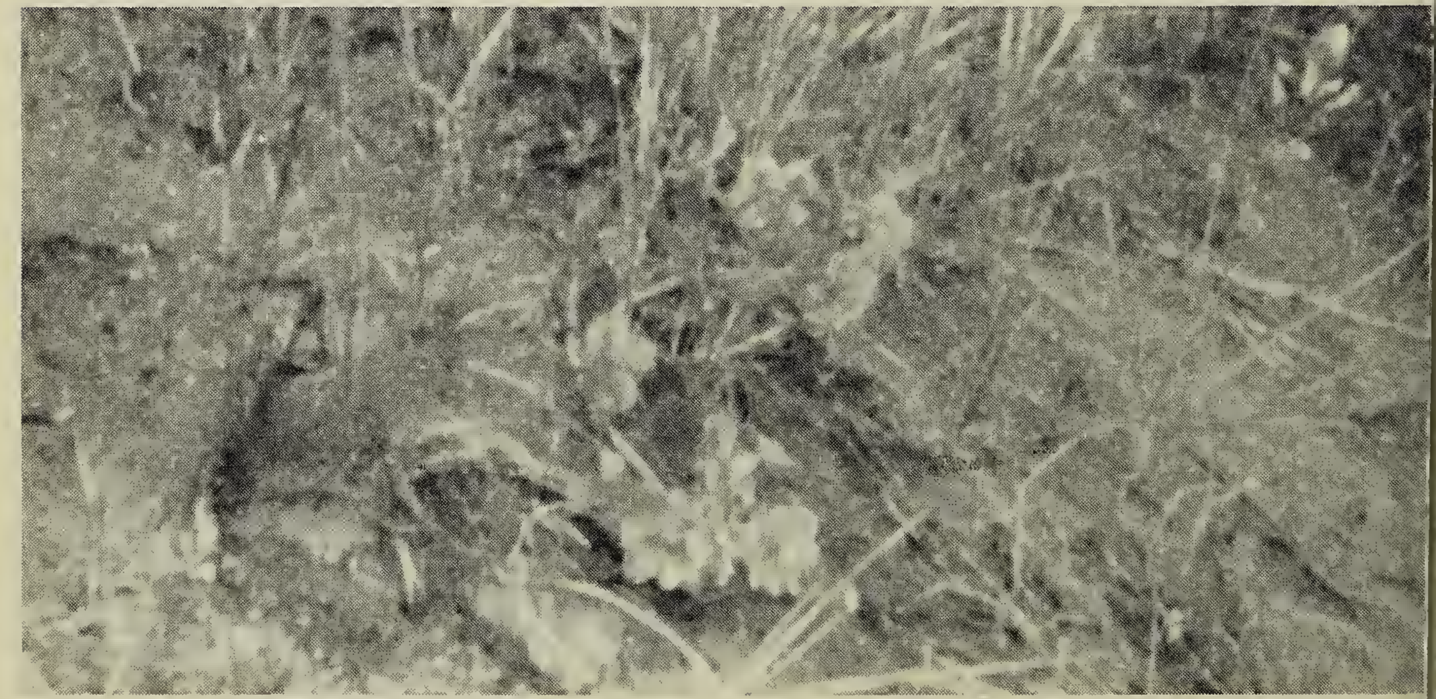
Duplicates of these collections have been deposited with the herbaria SASK. (University of Saskatchewan), REG. (University of Regina), QFA (University of Laval).

[1] BREITUNG, A.J. 1959. Supplement to "Flora of Saskatchewan". Am. Midland Naturalist 61 (2), 510-512.

[2] HARMS, V.L., and HUDSON, J.H. 1978. Some Vascular Plants New to the Flor of Saskatchewan. Canadian Field- Naturalist 92, 389-391.

[3] JOHNSTON, HOPE and HALLWORTH BERYL. 1975. Further Discoveries o Sand Verbena in Alberta. Blue Jay 33 (1), 13-15.

[4] MAHER, R.V., ARGUS, G.W., HARMS V.L., and HUDSON, J.H. 1979. Th Rare Plants of Saskatchewan Syllogeus No. 20, National Museum o Canada, Ottawa.



Sand Puffs or Sand Verbena. *John Hudso*

ADDITIONS TO THE FLORA OF MANITOBA AND OTTERBURNE AREA

JEAN-PAUL BERNARD, Herbier Louis-Marie, Université Laval, Québec

The first is new to Manitoba.

RED-ROOTED UMBRELLA-SEDGE

(*Cyperus erythrorhizos* Mũhl.) — Salmonia Channel S of Winnipeg Lake, moist area, 27 August 1961. B61-51 (QFA) identified by B. Boivin and C. Roy, Indigenous and largely distributed in U.S.A. In Canada, known in few localities in southern Ontario (Scoggan 1978) also known from southern B.C.[3] [1]

Seems native in southern Ontario where it is known from Grimby (DAO) in Lincoln County, Saint Williams and Long Point (DAO, OAC, TRT) in Norfolk County, Stoney Creek (DAO) in Wentworth County, and Pointe aux Pins (MTMG) in Kent County. Also reported for Lambton County by Gaiser 1966 and Scoggan 1978 and for Waterloo County by Scoggan 1978. Perhaps only adventive elsewhere in Canada.

The remaining are additions to the Flora of the Otterburne area.[2]

WOOD ANEMONE

(*Anemone quinquefolia* L. var. *interior* Fern.) — Woods along Rat River, Otter-urne, 13 June 1959, B59-24 (QFA).

SUGAR BEET

Beta vulgaris L. var. *crassa* Alef.) — Niverville, sprouting in a ditch near to a ield of sugar beet, 9 July 1959, B59-81 QFA). No doubt a casual and evanes-ent escape.

FIELD CHICKWEED

Cerastium arvense L. var. *viscidulum* Gremli) — Railway bank, Otterburne, 15 une 1959, B59-27 (QFA).

COMMON FUMITORY

(*Fumaria officinalis* L.) — Roadside 6 miles E of Otterburne 15 July 1959, B59-116 (QFA).

CELERY-LEAVED CROWFOOT

(*Ranunculus sceleratus* L. f. *natans* Gluck) — Roadside 6 miles E of Otterburne, 15 July 1959, B59-115 (QFA).

SPANGLETOP

(*Scolochloa festucacea* (Willd.) Link) — Railway bank 2 1/2 miles N of Otterburne, 9 July 1959, B59-78; also in the same date: roadside 3 miles N of Otterburne. B59-88 (QFA).

LANCE-LEAVED LOOSESTRIFE

(*Steironema hybridum* (Michx.) Raf.) — Roadside 3 miles NE of Otterburne, 9 July 1959, B59-103 (QFA).

[1] CESKA, A. & O. CESKA. 1980. Additions to the Flora of British Columbia, Can. Field-Nat. *94* (1):69-74.

[2] LOVE, D. & J.P. BERNARD. 1959. Flora and vegetation of the Otterburne area, Manitoba, Canada, Sv. Bot. Tidskr. *53* (4):335-461.

[3] SCOGGAN, H.J. 1978. The Flora of Canada, Part 2, 93-545; Part 3, 547-1115. National Museum of Canada.

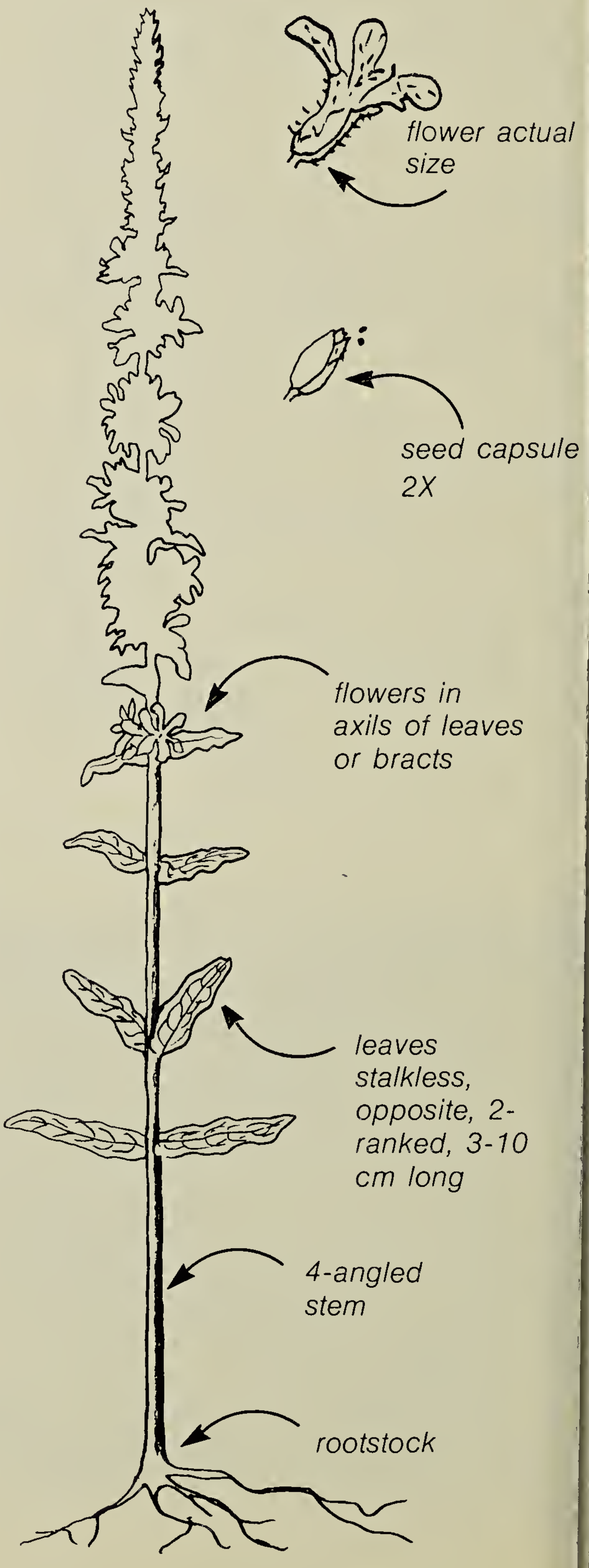
EDITOR'S NOTE: The abbreviations used above refer to the following herbaria: DOA = Dept. of Agriculture in Ottawa; MTMG = McGill University in Montreal; OAC = University of Guelph; QFA = Herbier Louis-Marie, University of Laval; TRT = Dept. of Botany, University of Toronto.

PURPLE LOOSESTRIFE

The U.S. Fish and Wildlife Service has been alerting all personnel about a new and pernicious invader in North America. Doug Wade sent a copy of their information to George Ledingham who has noted Purple Loosestrife along Wascana in Regina. The U.S. Fish and Wildlife Service map has a dot for Saskatoon as a known location. The persistence of this plant when it becomes naturalized is documented by Edwin Way Teale in the July 1982 issue of Audubon.[1] The number of seeds each plant is capable of producing is almost unbelievable (300,000). Mowing only serves to increase the numbers of the plant as each severed piece becomes a separate plant. It appears that the only way to be sure of destruction is to remove each plant from the site and burn them.

Purple Loosestrife (*Lythrum salicaria*) is an erect perennial with opposite, stalkless leaves in two ranks along a four-angled stem. It grows to 1.8 m tall with long spike-like arrangements of flowers that grow in the axils of bracts. The flowers are bright magenta and could look like fireweed at a distance, except that the loosestrife is a wetland herb. It can be very beautiful in expanses along the margins of streams but the rate at which it spreads and the fact that it can displace the native vegetation make it imperative to destroy it before it can become established here.

Gardeners take care — there are horticultural varieties of this species (including a red flowered one) and it has been praised as a honey plant for naturalization. Anyone who prizes the native vegetation of our wetlands should be ready to help them in the fight against this unrelenting weed.


flower actual size
seed capsule 2X
flowers in axils of leaves or bracts
leaves stalkless, opposite, 2-ranked, 3-10 cm long
4-angled stem
rootstock

---

[1] TEALE, EDWIN WAY. 1982. Stems beyond counting, flowers unnumbered. Audubon 84(4): 38-43.

BUTTERFLIES OF NORTHEASTERN ALBERTA

CHARLES D. BIRD, Box 165, Mirror, Alberta T0B 3C0; GERALD J. HILCHIE, 301, 8524 - 103 Street, Edmonton, Alberta T6E 4B5; NORBERT G. KONDLA, Alberta Energy and Natural Resources, 530 - 8th Street South, Lethbridge, Alberta T1J 2J8; WAYNE W. SMITH, 8220 Elbow Drive SW, Calgary, Alberta T2V 1K4; ELSIE KUYT, 3810 - 103B Street, Edmonton, Alberta T6J 2X9; JAMES K. RYAN, Ryan and Hilchie Biological Consultants Ltd., 10948 - 89 Avenue, Edmonton, Alberta T6G 0Z5 and TERRY W. THORMIN, Provincial Museum of Alberta, Edmonton, Alberta T5N 0M6

The butterflies and skippers of northeastern Alberta (Map 1) are described herein. The area is defined as that region from 56°N latitude north to the Northwest Territories border and from Saskatchewan west to the 5th Meridian (114° longitude). This region has received considerable attention of late due to its oil sand deposits.

Description of the Area

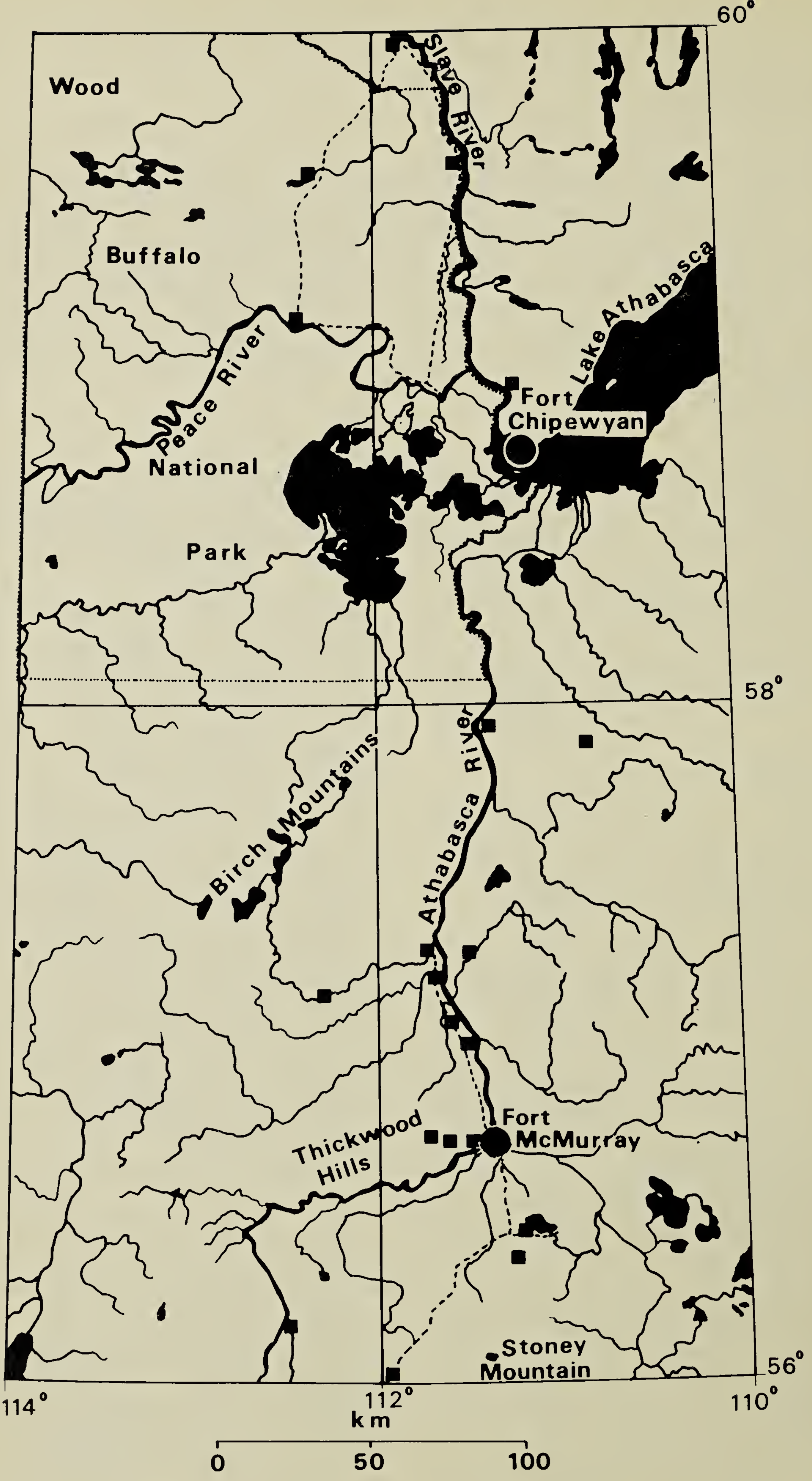
Butterfly diversity is linked with both the physical and biotic diversity of an area. Four major units occur in the boreal forest of northern Alberta; boreal mixed wood (most of study area), boreal-subarctic jackpine sand plains, boreal-subarctic alluvial lowlands, and subarctic woodland. These may be subdivided into 14 vegetation associations (Table 1). Different species of butterflies predominate in each e.g. Jutta Arctic (*Oeneis jutta*), Mancinus Alpine (*Erebia disa*), Frigga Fritillary (*Boloria frigga saga*), and Yukon Blue (*Plabejus optilete*) may be found flying in black spruce while upland forest is home for Macoun's Arctic (*Oeneis macounii*), Chryxus Arctic (*O. chryxus*), and Tiger Swallowtail (*Papilio glaucus*). Butterflies depend on specific members of the plant community for larval food and to a lesser extent, adult food.

Though somewhat dated, H. M. aup's publication on the vegetation nd flora of Wood Buffalo National Park is the best single account on the botany of northeastern Alberta and should be consulted by anyone interested in the plants of the area.[14]

Physiographic variation affects plant diversity and subsequently butterfly diversity. Major relief features in the area are five highland areas; Birch Mountains (520 m), Stoney Mountain (760 m), Muskey Mountain (580 m) and the eastern escarpment of the Caribou Mountains. The Fort Hills rise more than 100 m above the Athabasca River. Low lying areas between highlands and river flood plains are composed of flat to rolling terrain. In the province's northeast corner numerous small lake and areas of bare rock characterize the Canadian Shield. A large portion of the south and west region is underlain by oil sand deposits, which are being mined and processed by Suncor and Syncrude oil extraction plants.

All creeks arising in the study area are ultimately drained by the Athabasca and Peace rivers via the Slave River drainage. Much of the land is poorly drained, resulting in an abundance of marshes, bogs and fens.

Climate is characterized by long cold winters with short summers. Temperatures average from a maximum of 27°C in July to an average minimum of —23 to —30°C in January. The frost free period ranges from 80 to 100 days per year with an annual precipitation

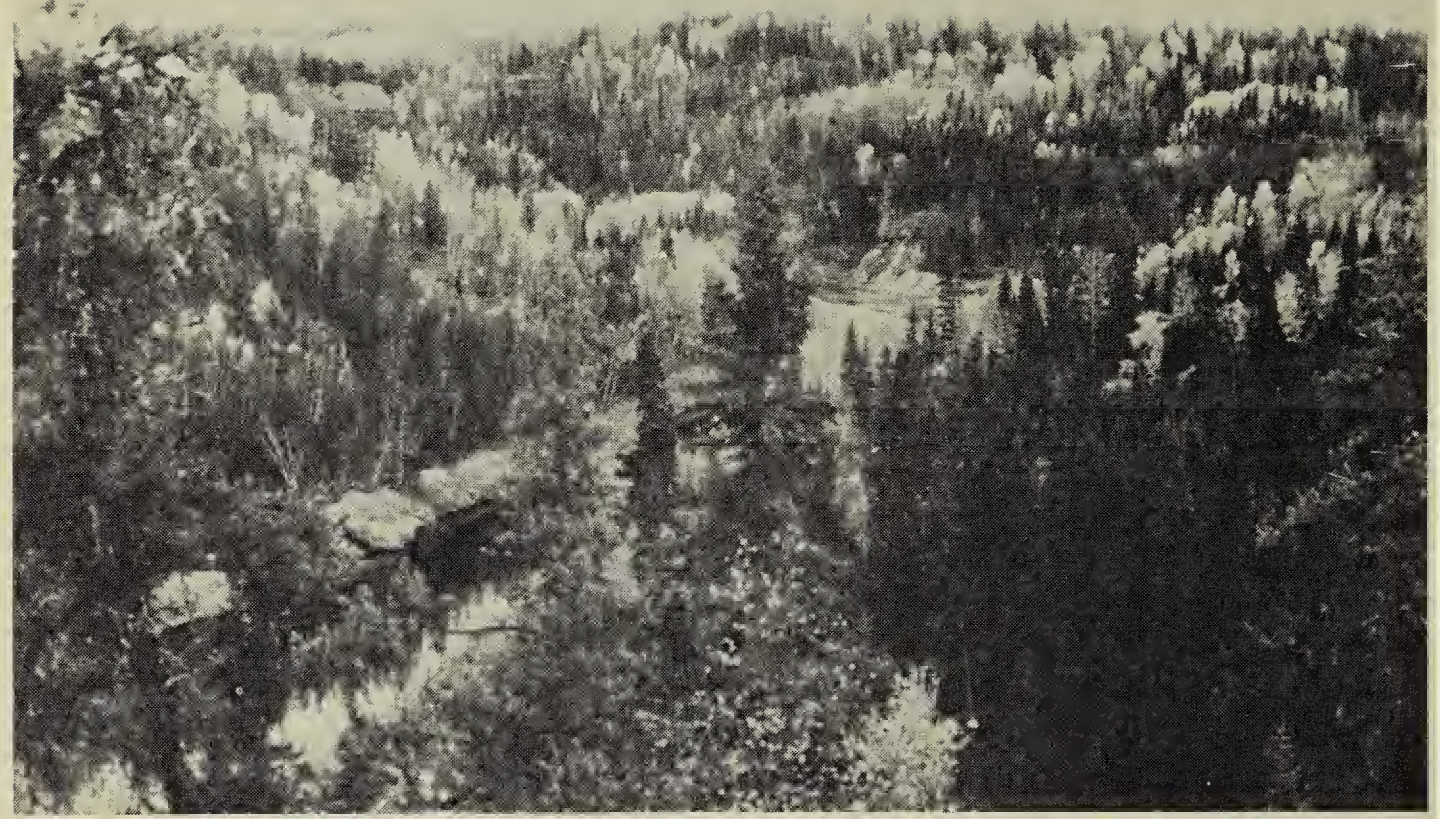


Map of northeastern Alberta. Collection sites are indicated by solid squares.

Table 1. VEGETATION TYPES OF NORTHEAST ALBERTA ADAPTED FROM THOMPSON *et al.*, 1978.

Vegetation Association	*Composition*
Bottomland Communities	
Bottomland and riparian forest	Balsam Poplar, Trembling Aspen, White Spruce, willow, alder, Paper Birch
Deciduous shrub wetland	willow, alder, Dwarf Birch, immature Trembling Aspen, Paper Birch
Upland Communities	
White Spruce-aspen, spruce dominated	White Spruce, Trembling Aspen,
White Spruce-aspen, mixed	White Spruce, Jack Pine, Trembling Aspen
White Spruce-aspen, aspen dominated	Trembling Aspen, White Spruce, Jack Pine
Mixed coniferous	Black Spruce, Jack Pine, White Spruce
Jack Pine	Jack Pine, Black Spruce, White Spruce, Trembling Aspen
Upland open	grasses, low herbs and shrubs
Mixed forest	Trembling Aspen, White Spruce, Black Spruce, Tamarack, Paper Birch, Jack Pine, alder
Wetland Communities	
Fen	sedges, rushes, low scattered shrubs, tall shrubs
Black Spruce bog	Black Spruce, sphagnum mosses
Semi-open Black Spruce, Tamarack bog forest	Black Spruce, Tamarack, sphagnum mosses, sedges, rushes
Lightly forested Tamarack and open muskeg	Tamarack, Black Spruce, low shrubs, sphagnum mosses
Disturbed Communities	
Non-vegetated	recent slides, clearings, slumps with sparse vegetation, burns

Thickwood Hills — burned spruce bog as willow-alder shrub wetland. *Ryan & Hilchie Biological Consultants Ltd.*



MacKay River near Fort MacKay — in autumn. Ryan & Hilchie Biological Consultants Ltd.

range of 36 cm in the Peace-Athabasca Delta to 56 cm at Stoney Mountain. Seasonal fluctuations in climate affect changes in distribution and abundance of butterflies. Climate as a whole affects the distribution of host plants and subsequently the distribution patterns of butterflies.

Butterfly Faunal Source Regions

During the Wisconsinian glacial, northeastern Alberta was under the Laurentide Ice sheet. Animals colonized the region following retreat of the ice sheet and subsequent recolonization by plants. Butterflies may be associated with different faunal source areas. Species associated with the boreal biome include Mancinus Alpine (*Erebia disa*), Red-disced Alpine (*E. discoidalis*), Jutta Arctic (*Oeneis jutta*), Chryxus Arctic (*O. chryxus caryi*), Giant Sulpher (*Colias gigantea gigantea*), Eastern Pine Elfin (*Callophrys niphon clarki*), Hudsonian Old World Swallowtail (*Papilio machaon hudsonianus*) and Frigga Fritillary (*Boloria frigga saga*).

Hecla Sulpher (*Colias hecla*) and Yukon Blue (*Plebejus optilete yukona*) are correlated with a northern sub-arctic refugium, dispersing southward and eastward into the study area.

Two-banded Checkered Skipper (*Pyrgus ruralis*), California White (*Pieris sisymbrii*), Creusa Marble (*Euchloe creusa*), and Mariposa Copper (*Lycaena mariposa*)[a] have a cordilleran origin, and occur here at the northeast limit of their range.

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[a] EDITOR'S NOTE: Mariposa Copper (*Reakirt's Copper*) has been taken in central Saskatchewan eastward to the northeast corner of Prince Albert National Park. — W. Harris.

Ells River near SE escarpment of Birch Mountains. *Ryan & Hilchie Biological Consultants Ltd.*

During the Hypsithermal, climatic conditions were warmer and drier than present. Northward extensions of grassland species were possible. Under present climatic regimes, dry, grass covered hillsides are found along the Athabasca River, some of its larger tributaries, and in portions of the Birch Mountains. Sandy, open jackpine forest with active sand dunes form an extensive plain east of the Athabasca River. Prairie-like grasslands (Wood Buffalo prairie) are found north of the Birch Mountains. Prairie species found in these habitats include Peck's Skipper (*Polites coras*), Common Checkered Skipper (*Pyrgus communis*), and Small Wood Nymph (*Cercyonis oetus charon*), Ochre Ringlet (*Coenonympha ochracea mackenziei*), is closely related to the prairie dwelling ringlets. Other prairie insects have been collected and more discoveries are expected.[16]

Recent disturbance by man (roads, gardens, farms) has permitted colonization by the Cabbage White (*Pieris rapae*) and Yellow Alfalfa Butterfly (*Colias philodice eriphyle*).

Some species cannot be identified as being associated with a specific biome because they are ubiquitous, and it can be inferred that they survived the Wisconsinian south of the ice sheet. Such species are Mourning Cloak (*Nymphalis antiopa*), Milbert's Tortoise Shell (*N. milberti*), Pearl Crescent (*Phyciodes tharos*), Silvery Blue (*Glaucopsche lygdamus*), Spring Azure (*Celastrina argiolus*) and Western Tailed Blue (*Everes amyntula*).

The composite we see today is a result of thousands of years of migrations, colonization and changes in the position of vegetation zones. High vagility and lack of fossil evidence impairs reconstruction of butterfly faunal changes in the study area. Present distributions may be used to deduce past biogeographical events.

History

The earliest collections in the area were a few made by Mrs. Christina Ross, wife of Bernard Ross who was in charge of the Mackenzie District for the Hudson Bay Company, at Smith Portage in 1862 and then sent to W. H. Edwards. He named Christina Sulpher (*Colias alexandra christina*) in her honor.

Miss Elizabeth Taylor made a trip down the Athabasca, Slave and Mackenzie Rivers in 1892 and collected a number of butterflies for the British Museum.[1]

Merritt Cary, of the U.S. Biological Survey, in company with Edward A. Preble made numerous collections along the Athabasca and Slave Rivers in 1903 (Cary 1907).

Later collections were made by J. Russell at Fort Chipewyan in 1927; G. Cinnamon at House River in 1932 and 1933; G. E. Ball and W. J. Brown at Fort McMurray in 1953; E. Gautreau at Peace Point in 1967; Elsie Kuyt in Wood Buffalo National Park in 1973[13], 1974, 1975 and 1976; and Wayne W. Smith at Gregoire Lake in 1976. F. Sperling collected at Fort McMurray and Stoney Mountain on May 30, 1981. Work for the Provincial Museum permitted T. Thormin and L. Bogaert to collect in the area south of Fort Smith from June 17-23, 1981.

Development of petroleum reserves from tar sands led to research which resulted in recent collections by W. B. Porter 20 miles north of Fort McMurray in 1974; N. G. Kondla at the Home Oil Lease a few miles ENE of Fort MacKay in 1975; Wayne Smith at the Shell Test Pit, 40 miles ENE of Fort MacKay in 1977; extensive studies by G. J. Hilchie and J. K. Ryan in 1978-1979 at Mildred Lake, Fort MacKay, Ellis River, Thickwood Hills, Tar Island (Suncor), Fort McMurray, Mariana Lake and Stoney Mountain Lookout; and Bernadette Otto at Mildred Lake and the Thickwood Hills in 1979.

Species List

The present study is a sequel to that of west-central Alberta by Case and Bird.[4] This list uses the same format and most of the nomenclature of R. R. Hooper's "Butterflies of Saskatchewan' rather than that of Miller and Brown who propose many changes in the scientific names of local butterflies.[12] The collectors names are given in brackets. Those collections made by Hilchie and Ryan are abbreviated to "HR". Collections made by Bogaert, Kuyt and Thormin in Alberta 1-13 km south of Fort Smith, N.W.T. are listed simply as Fort Smith.

Hesperiidae - Skippers

ROADSIDE SKIPPER (*Amblyscirtes vialis*). 6 June-23 July. A common species of clearings, trails and roadsides. Known from Fort MacKay (Kondla), Fort Smith (Thormin), Mildred Lake (HR), Shell Pit (Smith), and Thickwood Hills (HR).

PECK'S SKIPPER (*Polites coras*). 26 July. Rare. Found in clearings and grasslands. Known from Mildred Lake (HR).

ARCTIC SKIPPER (*Carterocephalos palaemon*). 29 May-14 July. A common species of open woods, roadsides and clearings. Known from Fort MacKay (Kondla), Fort McMurray (Ball, Brown), Fort Smith (Thormin), Gregoire Lake (Smith), Mildred Lake (HR), Pine Lake (Kuyt), and Shell Pit (Smith). Northern material may belong to ssp. *mackenziei* while the remainder is probably ssp. *mandan*.

ALPINE CHECKERED SKIPPER (*Pyrgus centaureae freija*). 5 July. Rare. Found in open woods and along roadsides. Known from the Thickwood Hills (HR). This is the first published record of this subspecies from Alberta.

TWO-BANDED CHECKERED SKIPPER (*Pyrgus ruralis*). 12 June. Rare. Known only from Smith Portage (Cary). A considerable range extension to the northeast, if correctly determined.

Cary's specimens were deposited at the United States National Museum but a recent search revealed no voucher to back up this report.[3] Further documentation is needed.

COMMON CHECKERED SKIPPER (*Pyrgus communis communis*). 7 July. Rare. A species of dry prairie grasslands. Its discovery at Mildred Lake (HR) is a remarkable northern range extension. E. M. Pike has recently found it in relict Peace River grasslands (pers. comm.).

DREAMY DUSKY WING (*Erynnis icelus*). 10 May-20 June. A common skipper of open woods and roadsides. Known from Fort MacKay (HR, Kondla), Gregoire Lake (Smith), House River (Cinnamon), Mildred Lake (HR), Pine Lake (Kuyt), Shell Pit (Smith), and Smith Portage (Cary, Preble).

PERSIUS DUSKY WING (*Erynnis persius*). 30 May-23 June. Occasional in open woods and cleared areas. Known from Fort Smith (Thormin), Pine Lake (Kuyt) and Shell Pit (Smith). Material from northeastern Alberta probably belongs to ssp. *borealis*.

NORTHERN CLOUDY WING (*Thorybes pylades*). 30 May-27 June. A common species of open mixed woods and roadsides. Known from Fort McMurray (Ball, Brown), Fort Smith (Kuyt, Thormin), Gregoire Lake (Smith), Mildred Lake (HR), Smith Portage (Cary), and Shell Pit (Smith).

Papilionidae - Swallowtails

HUDSONIAN OLD WORLD SWALLOWTAIL (*Papilio machaon hudsonianus*). Reported from Fort Chipewyan by McDunnough and Bowman without mention of date, collector, or location of voucher specimen.[11 2]

TIGER SWALLOWTAIL (*Papilio glaucus canadensis*). 25 May-2 July. Common in areas of aspen and mixed woods. Known from Fort MacKay (Kondla), Fort McMurray (Ball, Brown, Sperling), Fort Smith (Thormin), Gregoire Lake (Smith), Mildred Lake (HR, Otto), Peace Point (Gautreau), Pine Lake (Kuyt), Shell Pit (Smith), Slave River 50 miles north of Fort Chipewyan (Cary), Smith Portage (Cary) and Stoney Mountain (Sperling).

Pieridae - Whites, Sulphurs and Marbles

CALIFORNIA WHITE (*Pieris sisymbrii flavitincta*). 4-8 June. An occasional species of river banks and roadsides. Known from Fort Chipewyan (Cary) and Pine Lake (Kuyt).

WESTERN CHECKERED WHITE (*Pieris occidentalis occidentalis*). 10 July. Known only from a collection made at Mildred Lake (Otto).

MUSTARD WHITE (*Pieris napi oleracea*). 10 May-29 July. A common species of open aspen and mixed woods. Known from Ells River (HR), Fort MacKay (Kondla), Fort McMurray (Ball), Fort Smith (Thormin), Gregoire Lake (Smith), House River (Cinnamon), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), Smith Portage (Cary), Stoney Mountain (Sperling), and Thickwood Hills (HR).

CABBAGE WHITE (*Pieris rapae*). 2 June-15 July. Occasional in disturbed areas. Known from Fort McMurray (Brown) and Gregoire Lake (Smith).

HECLA SULPHUR (*Colias hecla*). 29 June. Known from a collection made at the Ells River (HR). Probably the subspecies *hela* which was described from Churchill, Manitoba. If the latter, it is new to Alberta.

ALFALFA BUTTERFLY (*Colias eurytheme eurytheme*). 2-25 August. Material that may belong to this migrant butterfly is known from the House River (Cinnamon) and Shell Pit (Smith). The distinction between it and *Colias alexandra christina* is sometimes not clear cut.

YELLOW ALFALFA BUTTERFLY (*Colias philodice eriphyle*). 29 May-18 July. Occasional in disturbed areas. Known from Fort McMurray (Ball, Brown, HR, Sperling), Fort Smith (Thormin) and Gregoire Lake (Smith).

PINK-EDGED SULPHUR (*Colias interior interior*). 3-31 July. Common in open woods and along roadsides. Known from Fort MacKay (HR), Mildred Lake (HR, Otto) and the Thickwood Hills (HR, Otto).

GIANT SULPHUR (*Colias gigantea gigantea*). 23 June-18 July. An occasional species of bogs, fens and wet woods. Known from the Ells River (HR), Fort MacKay (HR), Fort Smith (Kuyt, Thormin) and Gregoire Lake (Smith).

CHRISTINA SULPHUR (*Colias alexandra christina*). 10 May-7 August. A common species of open woods and river banks. Known from Fort MacKay (HR), Fort McMurray (Ball, Porter), Fort Smith (Bogaert, Kuyt, Thormin), Mildred Lake (Otto), Pine Lake (Kuyt), Shell Pit (Smith), and Smith Portage (Ross).

CREUSA MARBLE (*Euchloe creusa*). 17 May-8 June. Material from Pine Lake (Kuyt) and Shell Pit (Smith) extends the known range of this species to the northeast.

LARGE MARBLE (*Euchloe ausonides*). 19 May-13 June. Occasional to common in open woods and along streams and roads. Known from Fort MacKay (Kondla), Fort McMurray (Brown), Mildred Lake (HR, Otto), Pine Lake (Kuyt), and Smith Portage (Cary). Local material may belong to ssp. *ausonides*, ssp. *mayi* or may be in a blend zone between the two.

Lycaenidae - Gossamer-winged Butterflies

HOARY ELFIN (*Callophrys polios obscurus*). 21 May-23 June. Common in jackpine woods near its food plant, bearberry. Known from Fort MacKay (HR), Mildred Lake (HR, Otto) and Pine Lake (Kuyt).

BROWN ELFIN (*Callophrys augustinus augustinus*). 1 May-23 June. Common in dry areas near its food plant, bearberry. Known from Fort Chipewyan (Cary), Fort MacKay (Kondla), Fort Smith (Thormin), Gregoire Lake (Smith), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), Smith Portage (Cary), Stoney Mountain (Sperling), and Thickwood Hills (HR).

EASTERN PINE ELFIN (*Callophrys niphon clarki*). 1-6 June. This rare species of jack pine woods was first reported for Alberta by Reist (1979). Known from Pine Lake (Kuyt). Incorrectly reported as *C. eryphon* by Philip based on a 1973 collection from Pine Lake by Elsie Kuyt.[13]

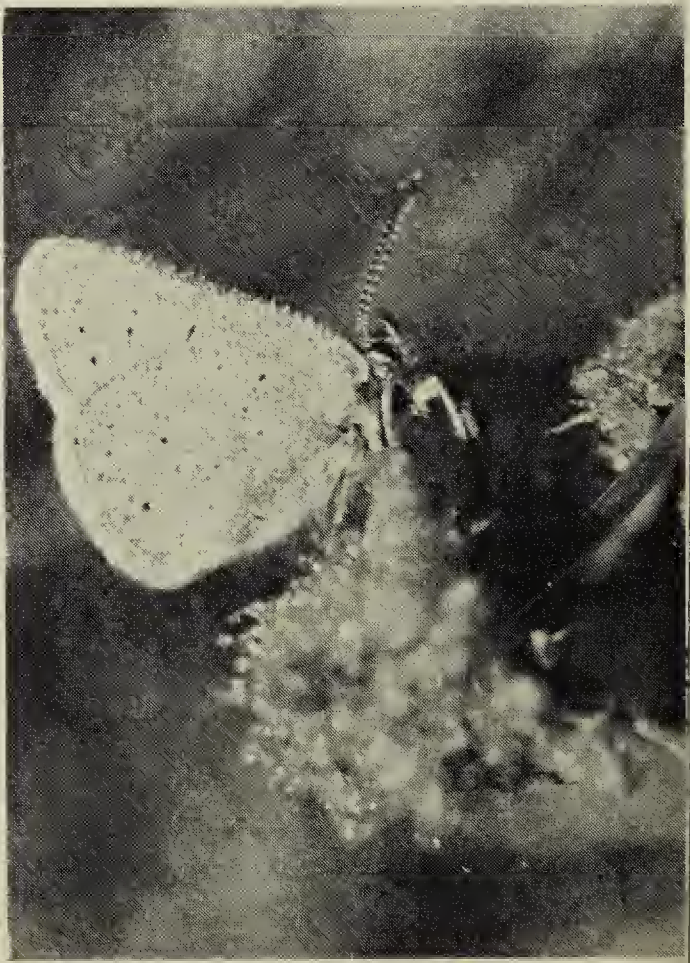
BRONZE COPPER (*Lycaena thoe*). 16-30 July. A rare species of wet meadows. Known from Fort McMurray (Ball) and Tar Island (Suncor) (HR).

MARIPOSA COPPER (*Lycaena mariposa*). 22 June-8 July. Occasional in coniferous woods. Known from Fort McMurray (Brown) and Mildred Lake (HR). The subspecific status is uncertain.

DORCAS COPPER (*Lycaena dorcas dorcas*). 3 June-2 August. Common in wet woods. Known from Fort Chipewyan (Cary), Fort MacKay (HR), Gregoire Lake (Smith), Mildred Lake (HR, Otto), Shell Pit (Smith), and the Thickwood Hills (HR, Otto).

SCUDDER'S BLUE (*Lycaeides argyrognomon scudderii*). 23 June-26 July. Occasional in open woods and along roads. Known from Fort MacKay (HR), Fort McMurray (Brown), Fort Smith (Kuyt, Thormin), and Mildred Lake (HR).

GREENISH BLUE (*Plebejus saepiolus amica*). 17 June-23 July. A species of grassland areas and roadsides. Known from Ells River (HR), Fort MacKay (HR), Fort McMurray (Brown), Fort Smith (Thormin) and the Thickwood Hills (HR, Otto).



Greenish Blue. *Gary Anweile*

YUKON BLUE (*Plebejus optilete yukona*). 3-31 July. Found in local colonies in wet coniferous woods. Known from Fort MacKay (HR), Mildred Lake (HR, Otto), and the Thickwood Hills (HR).

ARCTIC BLUE (*Plebejus aquilo*). 11-12 June. Known only from Smith Portage (Cary). Northeastern Alberta lies between the ranges of three subspecies: *lacustris*, described from Norway House, Manitoba, in the boreal forest to the east; *rustica*, described from Colorado, in the prairies to the south; and *megalo*, described from Lillooet, B.C., from B.C. into the Rocky Mountains of Alberta and north into the Yukon and to Great Bear and Great Slave Lakes in the Northwest Territories.[8]

WESTERN TAILED BLUE (*Everes amyntula albrighti*). 27 May-16 July. Abundant in aspen and mixed woods. Known from Ells River (HR), Fort MacKay (HR, Kondla), Fort McMurray (Ball, Brown), Fort Smith (Kuyt, Thormin), Gregoire Lake (Smith), Pine Lake (Kuyt), Shell Pit (Smith), Smith Portage (Cary), and the Thickwood Hills (HR, Otto). Cary reported both *E. comyntas* and *E. amyntula* but it is unlikely that the former occurs in this area.[3]

Western Tailed Blue. *Gary Anweiler*

SILVERY BLUE (*Glaucopsyche lygdamus couperi*). 10 May-3 July. Abundant in open woods, clearings and along roadsides. Known from the Athabasca River (Taylor), Ells River (HR), Fort Chipewyan (Cary), Fort MacKay (HR, Kondla), Fort McMurray (Brown, HR), Fort Smith (Thormin), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), Smith Portage (Cary), Stoney Mountain (Sperling), and the Thickwood Hills (HR).

SPRING AZURE (*Celastrina argiolus lucia*). 4 May-25 June. Common along streams and other areas where its food plant, red osier dogwood, occurs. Known from Fort MacKay (HR, Kondla), Fort McMurray (Brown), Fort Smith (Thormin), Gregoire Lake (Smith), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), Stoney Mountain (Sperling), and the Thickwood Hills (HR).

Nymphalidae - Brush-footed Butterflies

WHITE ADMIRAL (*Limenitis arthemis rubrofasciata*). 21 June-18 July. Common in aspen and mixed woods. Known from Ells River (HR), Fort MacKay (HR), Fort McMurray (Ball), Fort Smith (Thormin), Gregoire Lake (Smith), and Mildred Lake (HR, Otto).

VICEROY (*Limenitis archippus archippus*). 15 June-7 July. Occasional along river banks. Known from Ells River (HR), Fort MacKay (HR), and Shell Pit (Smith).

RED ADMIRAL (*Vanessa atalanta rubria*). 30 May-9 June, 21 August-30 September. Found near patches of stinging nettle. Known from Fort McMurray (Sperling), Fort Smith (Thormin), House River (Cary), Mariana Lake (HR), mouth of the Riviere de Rochers (Cary), and Shell Pit (Smith).

PAINTED LADY (*Vanessa cardui*). 4 July-22 August. Migrant individuals are known from Fort MacKay (HR) and the Thickwood Hills (HR, Otto).

COMPTON TORTOISE SHELL (*Nymphalis vau-album watsoni*). 4 July-6 September. Common in deciduous woods. Known from the Athabasca River 60 miles above the delta (Cary), Fort Chipewyan (Russell), Fort McMurray (Ball), Gregoire Lake (Smith), House River (Cinnamon), Richardson

Lookout (HR), Shell Pit (Smith), and the Thickwood Hills (HR).

MILBERT'S TORTOISE SHELL (*Nymphalis milberti furcillata*). 31 May-14 August. Occasional in open deciduous woods and disturbed areas. Known from Fort Chipewyan (Russell), Fort MacKay (HR), Fort McMurray (Ball), Fort Smith (Kuyt, Thormin), Gregoire Lake (Smith), and Mildred Lake (HR).

MOURNING CLOAK (*Nymphalis antiopa antiopa*). 23 June-5 September. Common in deciduous woods and along streams. Known from Fort Chipewyan (Russell), Fort McMurray (Ball), Fort Smith (Thormin), Gregoire Lake (Smith), House River (Cary), Fort MacKay (HR), Pine Lake (Kuyt), and the Thickwood Hills (HR).

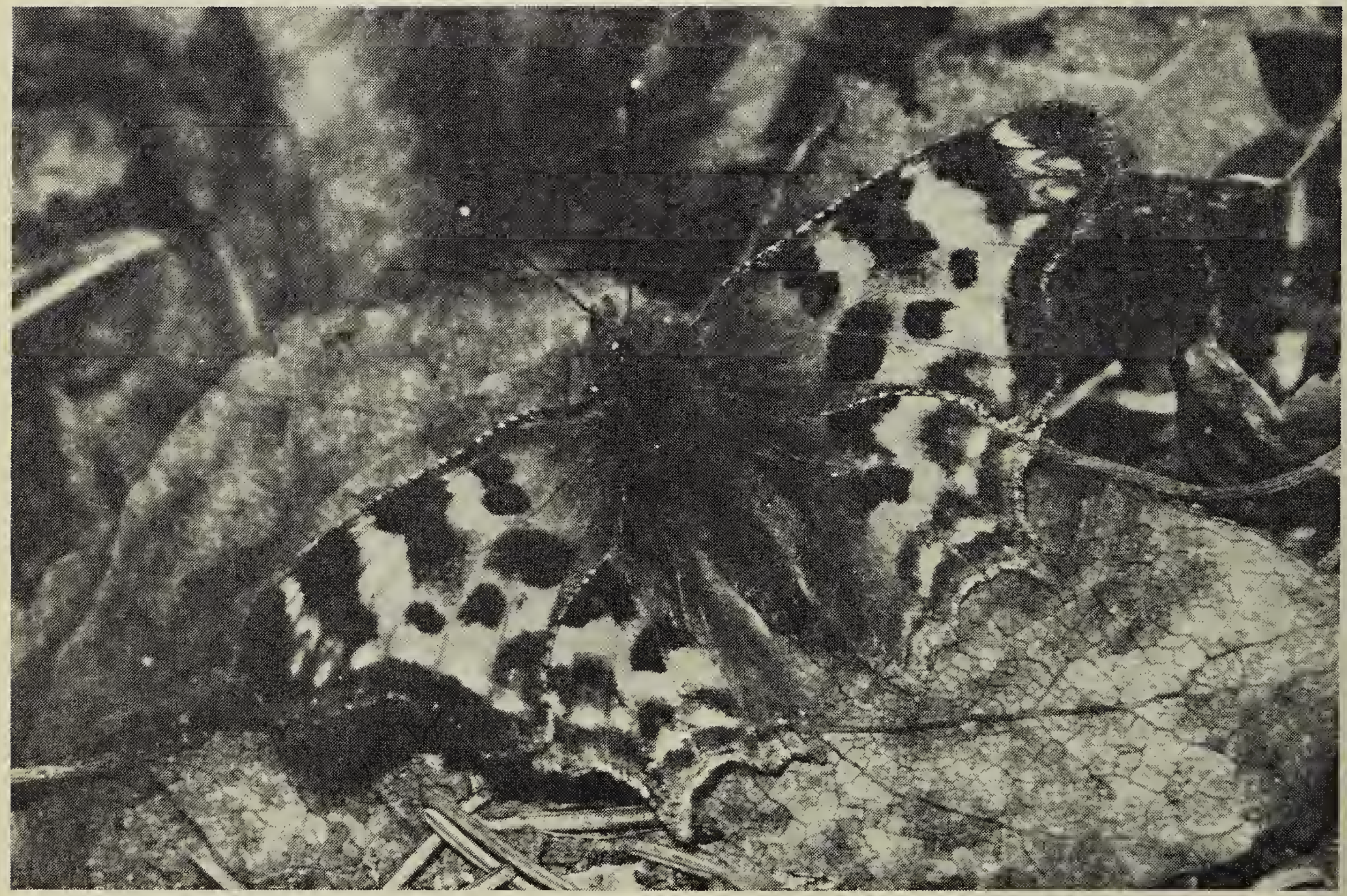
SATYR ANGLE WING (*Polygonia satyrus satyrus*). 10 May-31 June, 26 July-31 August. This common overwintering species occurs in deciduous woods near stinging nettle, its food plant. Known from Fort Chipewyan (Russell), Fort MacKay (HR), Fort McMurray (Ball, Brown), Mildred Lake (Otto), Pine Lake (Kuyt), and the Thickwood Hills (HR).

GREEN COMMA (*Polygonia faunus*). 29 May-22 August. Common in deciduous and mixed woods. Known from Athabasca River delta (Cary), Fort Chipewyan (Russell), Fort MacKay (HR), Fort McMurray (Ball, Brown, HR), Gregoire Lake (Smith), Mildred Lake (HR), Pierre au Calumet (Cary), Pine Lake (Kuyt), Shell Pit (Smith), Smith Portage (Cary), and the Thickwood Hills (HR).

HOARY COMMA (*Polygonia gracilis*). June (no day recorded), 22 August. A rare species of mixed woods. Known from Mildred Lake (Otto), Pine Lake (Kuyt), and the Thickwood Hills (HR).

GRAY COMMA (*Polygonia progne*). 10 May-23 June, 26 July-25 August. An occasional species of mixed woods. Known from Fort McMurray (Ball), Gregoire Lake (Smith), House River (Cinnamon), Fort Smith (Thormin), and Shell Pit (Smith).

PEARL CRESCENT (*Phyciodes tharos*). 2 June-10 August. Abundant in open woods, clearings, meadows, roadsides and along streams. Known from Fort MacKay (HR), Fort McMurray (Ball,



Satyr Angle Wing. *Fred Lahrman*

Brown), Fort Smith (Kuyt, Thormin), Gregoire Lake (Smith), House River (Cinnamon), Mildred Lake (HR, Otto), Stoney Mountain Lookout SE of Gregoire Lake (HR), and the Thickwood Hills (HR).

TAWNY CRESCENT (*Phyciodes batesii*). 20 June 1977. Known from one collection by Smith at Shell Pit. Variability in appearance of the hindwing underside in comparison with eastern populations of this species has led to frequent misidentification of western specimens.

SILVER-BORDERED FRITILLARY (*Boloria selene*). 20 June-3 August. A common species of open woods, roadsides and meadows. Known from Fort McMurray (Ball, Brown), Gregoire Lake (Smith), Mildred Lake (HR), Shell Pit (Smith), and the Thickwood Hills (HR, Otto). The line between ssp. *albequina* and ssp. *atrocostalis* occurs in or near northeastern Alberta.

MEADOW FRITILLARY (*Boloria bellona jenistai*). 4 June-17 August. Found occasionally in meadows and cleared areas. Known from Fort MacKay (Kondla), Fort McMurray (Brown), and Mildred Lake (HR).

FRIGGA FRITILLARY (*Boloria frigga saga*). 25 May-24 June. A common species of wet coniferous woods, bogs, and birch and willow fens. Known from Fort MacKay (HR, Kondla), Fort Smith (Thormin), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), and Stoney Mountain (Sperling).

FREIJA FRITILLARY (*Boloria freija freija*). 1 May-24 June. A common species of dry willow fens and open coniferous woods. Known from Fort MacKay (HR), Gregoire Lake (Smith), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Smith Portage (Cary), and Stoney Mountain (Sperling).

URPLE LESSER FRITILLARY (*Boloria titania grandis*). 16 July-22 August. A common species of roadsides and clearings in mixed woods. Known from Fort MacKay (HR), Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), and the Thickwood Hills (HR).

OG FRITILLARY (*Boloria eunomia*). 23-25 June. An occasional species of wet coniferous woods and bogs. Known from Fort MacKay (HR), Fort Smith (Thormin), and Mildred Lake (Otto). Regional material could belong to either ssp. *dawsoni* or ssp. *triclaris*.

ATLANTIS FRITILLARY (*Speyeria atlantis*). 5 July-20 August. Abundant throughout the area. Darker individuals of the ssp. *hollandi* type, appear to be restricted to wet coniferous woods and bogs. Known from Fort Chipewyan (Russell), Fort McMurray (Ball, Brown, Taylor), Gregoire Lake (Smith), House River (Cary, Cinnamon), Mildred Lake (HR, Otto), Shell Pit (Smith), and the Thickwood Hills (HR, Otto).

VARIEGATED FRITILLARY (*Euptoieta claudia*). 6 July. Rare. Known only from the Thickwood Hills (HR).

Satyridae - Meadow Browns, Arctics and Alpines

OCHRE RINGLET (*Coenonympha ochracea mackenziei*). 23 June. Uncommon in open grassy areas. Known from Fort Smith (Bogaert, Thormin). New to Alberta, this species has been collected by Elsie Kuyt on 4 and 6 July 1974 at Fort Smith, N.W.T. just north of the Alberta border. It was described from material taken by J. Russell at Nyarling River, N.W.T., on 4 July 1926.[5] T. C. Emmel states that it occurs "in the vicinity of Great Slave Lake in the Mackenzie District".[9]

SMALL WOOD NYMPH (*Cercyonis oetus charon*). A fresh male labelled "McMurray, 6 July 1953, G. E. Ball" is in the Canadian National Collection. This is a considerable range extension to the northeast. Further documentation is needed to establish the status of the species in the area.

MACOUN'S ARCTIC (*Oeneis macounii*). 6 June-10 July. Locally common in coniferous woods. Known from Fort McMurray (Ball, Brown), Fort Smith (Thormin), Mildred Lake (HR, Otto), and Shell Pit (Smith). All collections have been made in odd-numbered years (1953, 1977, 1979, 1981). John Masters (1974) has stated that the "insect flies only in odd-numbered years from the Riding Mountains west".

CHRYXUS ARCTIC (*Oeneis chryxus caryi*). 10-23 June. An occasional species of coniferous woods. Known from Fort MacKay (Kondla), Fort McMurray (Brown), Mildred Lake (HR), and Smith Portage (Cary). The subspecies *caryi* was described (Dyar 1904) from material collected by M. L. Cary at Smith Landing on 13 June, 1903.

JUTTA ARCTIC (*Oeneis jutta*). 30 May-24 June. An occasional species of wet coniferous woods and bogs. Known from Fort MacKay (HR, Kondla), Fort Smith (Thormin), Mildred Lake (HR, Otto), and Shell Pit (Smith). Material from the area may belong to ssp. *ridingiana*.

DISA OR MANCINUS ALPINE (*Erebia disa mancinus*). 30 May-4 July. Common in wet coniferous woods. Known from Fort MacKay (HR, Kondla), Fort Smith (Thormin), Mildred Lake (HR, Otto), Peace Point (Gautreau), Pine Lake (Kuyt), Shell Pit (Smith), Stoney Mountain (Sperling), and the Thickwood Hills (HR).

RED-DISKED ALPINE (*Erebia discoidalis*). 4 May-12 June. Common near wet meadows. Known from Fort McMurray (Brown, HR). Mildred Lake (HR, Otto), Pine Lake (Kuyt), Shell Pit (Smith), and Smith Portage (Cary). Local material may belong to either ssp. *mcdunnoughi* or ssp. *discoidalis*. W. Kirby described the latter in 1837 in John Richardson's "Fauna Boreali-Americani" from material collected at Cumberland House, Saskatchewan, while C.F. dos Passos described the former from White Horse, Alaska, and mentions its distribution as "further west in Alberta and extending northward to Alaska".[6] The differences between the two are slight and primarily involve the "red-disk". Kirby described it as "reddish-tawny" in *discoidalis* while dos Passos refers to it as "hazel" in *mcdunnoughi*.

Hypothetical Species

EYED BROWN (*Lethe eurydice eurydice*). Merritt Cary reports that he saw an individual at Smith Landing on 12 June 1903. There is no voucher specimen at the United States National Museum and, as there are no other reports, the species should be regarded as hypothetical for the area.

Specimen Location

The specimens of B. Otto, N. G. Kondla, F. A. H. Sperling and T. Thormin are in their collections, while those of W. W. Smith and Elsie Kuyt are at the University of Calgary. The specimens of G. J. Hilchie and J. K. Ryan are deposited in a synoptic collection of insects of the Alberta Oil Sands Environmental Research Program (AOSERP), a butterfly display box for AOSERP and in the private collection of G. J. Hilchie. The G. E. Ball, W. J. Brown, J. Russell and G. Cinnamon specimens are in the Canadian National Collection. M. L. Cary's specimens are at the United States National Museum.

Acknowledgements

The curators of the above collections are thanked for making their facilities open for study.

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Hornet nest. *B. de Vries*

WHITE FACED QUEEN WASP ATTACKS CRANE FLY AT THE PAS

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At 8:00 a.m. on 17 June 1982 it was clear, sunny and warm. I observed a white faced wasp pounce on a newly emerged crane fly (*tipulidae*) on the south side of the house. The wasp flew ahead a bit first, having spotted the crane fly on the wall drying its wings. It then backed up while in flight without turning and swiftly pounced on its prey. Both fell to the ground and rolled around with the wasp making attempts to sting. They were briefly out of view having fallen into a bed of flowering Iris. A moment late the wasp flew up holding the crane fly between her legs, the head foremost and the abdomen hanging between the wasp's legs.

In these parts, it is only the females or Queens which overwinter and start their paper nests in early spring. A protein-rich diet may be required to promote rapid growth of the larvae enabling the swift increase in wasp numbers that occurs in our brief summers.

OOLOGY ON THE NORTHERN PLAINS: AN HISTORICAL PREVIEW

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As part of a study of native raptor populations on the North American prairie, we have surveyed oologic records for information on early bird distribution patterns. The senior author surveyed all issues of *The Oologist* from 1886 to 1894 and *The Nidiologist* (later spelled *The Nidologist*) from 1893 to 1896 and found interesting material on the nesting of prairie birds. Fewer useful items were located in *The Young Oologist* (1884-1885), *Ornithologist and Oologist* (1881-1893), *The Hawkeye Ornithologist and Oologist* (1888-1918), *The Avifauna* (1895-1897), *The Ottawa Naturalist* (1887-1918), and *The Journal of Comparative Oology* (1920-1922). The junior author studied raptor sets in Canadian and American museums, particularly the collection of the Western Foundation of Vertebrate Zoology (WFVZ) in Los Angeles. With over 120,000 catalogued sets, the WFVZ has by far the largest collection of North American raptor eggs and includes nearly 200 falconiform sets collected in the prairie provinces alone.[11] In this and subsequent articles, we will summarize the record and attempt to give some insight into the once popular hobby of egg collecting and the motives behind the ambitious collecting trips that were made to the northern plains.

The first oologist to visit the Northern Plains was Lieutenant (later Captain) Thomas Wright Blakiston, magnetic observer with the Palliser expedition. He was stationed at Fort Carlton, 80 km north of present-day Saskatoon, from 23 October 1857 through early June 1858. An enthusiastic ornithologist, Blakiston's observations were published in *The Zoologist* and *The Ibis* between 1859 and 1863.[10] An active collector of bird specimens, Blakiston also sent a few eggs taken in 1858 to the Smithsonian Institution in Washington, D.C. These were: 2 sets (6 eggs each) of Brewer's Blackbird on 3 June, 1 set of Goshawk (4 eggs) on 7 May, 1 set of Merlin (4 eggs) on 25 May, and 1 set each of American Coot, Sharp-tailed Grouse, and Mallard without specific dates. Only 1 egg of each of these sets is extant. Bendire, in Volume 1 of his *Life Histories of North American Birds* published by the Smithsonian in 1892,

Thomas Blakiston. *Courtesy Saskatchewan Archives Board* correctly credited Blakiston with being the first man ever to collect eggs of the Ferruginous Hawk. On a buffalo hunting trip to the Anerley Lakes about 170 km SSW of Carlton, Blakiston had found two Ferruginous nests, one with five eggs and one with four eggs on 29 and 30 May.[8] One of these eggs is shown in colour in Bendire's plate 9.[2]

Egg collecting did not begin in earnest on the northern plains until about 1890. Prior to that, fur traders and early settlers were more interested in eggs as a source of food. Samuel Hearne (1795), who founded the first inland trading post of the Hudson's Bay Company at Cumberland House in 1774, for instance, remarked that the eggs of the Trumpeter Swan were "so big that one of them [was] sufficient meal for a moderate man without bread or any other addition." Because they were so easy to collect, eggs of ducks, geese, Sharp-tailed Grouse, and the ubiquitous Upland Sandpiper were used for food by settlers in the Wallace district northeast of Yorkton in 1892 (Kred Langstaff, pers. comm.). In North Dakota, eggs of colonial species such as Common Tern and Franklin's Gull were served in hotels as late as 1886.[14]

Within the first decade of settlement, the introduction of domestic poultry decreased the pressure on wild bird eggs for food and by the end of the century, eggs were far more highly valued by oologists for their shells. By then, oology had become popular throughout North America. As the demand for eggs of western species increased, nests were more frequently raided by egg collectors than by foraging settlers.

One hundred years ago, the energy that might today be devoted to listing, observing, photographing, or banding was then more often devoted to finding nests and collecting their eggs. Many well known ornithologists actually began with an interest in oology. A.C. Bent, for example, had "one of the largest private collections."[1] In Saskatchewan, the best example of oologist-turned-ornithologist was the late Maurice G. Street who obtained breeding records for no less than 141 species within 30 km of Nipawin.

Oology was then not only an acceptable hobby, but was more popular than philately or numismatics, part of the human passion to collect things of unusual beauty. The more serious collectors prided themselves with keeping accurate records. Data slips for each set listed observations such as the location of the nest, date of collection, species of nest tree, height of the nest, clutch size, and progress of incubation, as well as occasional interesting bits of information about difficulties encountered and chances taken while collecting. Many were intrepid climbers and apparently valued the eggs more than "life or limb."

Published accounts of such adventures made popular reading and many journals dealing with oology appeared. Some were short-lived, but *The Oologist* in its first years had a circulation of 2500, a much larger readership than *The Auk* which then had a circulation of only 500.[1] [13]

Oologists often bragged of the size of their collections. Dr. Morris Gibbs told, for example, how K.R. Wilhelm collected 113 Buteo eggs on a three day float down the St. Joseph River in southern Michigan.[6] J. Parker Norris, Jr., a Philadelphia lawyer, proudly boasted of owning 22,000 sets of nearly 600 species.[17] Norris had 970 eggs of the Kentucky Warbler, "the result of twelve years of hard work." As for his 150 Red-tailed Hawk eggs, Norris argued that "one could not begin to show all the variation that the eggs of that species are subject to in a series of that number."[12] In 1914, E.J. Darlington wrote a note in memory of his late friend William B. Crispin, describing how Crispin had personally collected 966

Common Tern at nest. *Wayne Lynch*

Osprey eggs. Darlington defended this seeming greed by adding: "they lay a second set when their nest is molested, so what's the objection to us taking their eggs, that are so beautiful in various shapes and colours."

Journals also provided dealers with an advertising medium. E.S. Rolfe, in 1899, for example, advertised in *The Oologist* that he had Bittern and Avocet eggs for sale at 40¢, Willet and Baird's Sparrow at 30¢, and Western Horned Owl at 60¢ each. W.E. Saunders, one of Canada's leading ornithologists, ran an ad in *The Oologist* offering a California Condor egg for sale at $150.[16]

Troubled by the reports of indiscriminate, wholesale collecting, E.S. Rolfe of Minnewaukon, North Dakota was one of the first oologists to publish warnings of the possible harmful effects of egg collecting.[14] Rolfe mentioned how in 1883 "the White Pelican bred on Devil's Lake in North Dakota in great numnbers and [that] a thrifty idler [had] shipped one or two barrels of their eggs to an Eastern dealer . . . since that time, they have not been known to nest there." Such reports were largely ignored and the hobby remained popular until the 1930s. During that time avid collectors throughout the northern plains included: Archibald Henderson, J.E. Houseman, G.F. Dippie, George Cook, Tom Randall, Evan Thomson, N.V. Fearnehough and Frank Farley in Alberta; Chris Forge, Ernest Norman, David Ogg, and John Cruttenden in Manitoba; Eugene Rolfe, Alfred Eastgate, E. Dodd, J.D. Currie, George Davy, G. Withey, G. Abbey and Frederick Philipp in northern North Dakota; and Edward Arnold, Walter

Raine, Frank Baines, W.C. Goelitz, S.J. Darcus, and W.A. and J.E. Bowman in Saskatchewan. Because of mounting criticism and a change of emphasis and interests, oology lost popularity during the 1940s and 1950s. The collection, sale, and trade of wild bird eggs became illegal. Since the mid 1960s nonscientific egg collecting has ceased.

Today, there are few private collections left. Nelson Hoy's collection of over 15,000 sets at Medina, Pennsylvania was the last large, private collection maintained in North America. The surviving egg sets, including Hoy's, are now maintained by museums throughout the United States and Canada. The data therein offer insight into the distribution of raptors at the turn of the century. Subsequent articles will deal with Edward Arnold, one of the foremost collectors and then regionally with those oologists who were active in the prairie regions of Manitoba, Saskatchewan, Alberta, Montana and North Dakota.

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American Avocet on eggs. *G. W. Beyersbergen*

1980 NEST CENSUS OF SASKATCHEWAN'S PELICAN AND CORMORANT COLONIES

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A 1980 census of White Pelican and Double-crested Cormorant nests was conducted in Saskatchewan as part of a continuing program to monitor the nesting status of these species in the province. Twelve pelican and seventeen cormorant colonies were surveyed with a total of 15,427 and 7,410 nests counted respectively. This represents an increase in numbers of both pelican and cormorant nests since the 1978 survey.

Methods

The census was conducted from 30 May - 7 June at what should be the height of incubating activity. Survey time ranged from 0745 to 0915 (Central Standard Time). The Cypress Lake colony was surveyed from the ground and all incubating adults were counted to determine the number of active nests. All the other colonies were surveyed by means of aerial photographs taken from a plane window with a handheld Pentax KX camera and a 200 mm lens. Kodachrome 64 color slide film was used. All photos were taken from a minimum altitude of 230 m as close as possible to vertical. This height did not disturb the birds. The slides were examined under a binocular microscope to count incubating adults.

The Preston Lake colony was surveyed by the Canadian Wildlife Service in Saskatoon. A report of cormorants nesting at Reed Lake was received late in the summer and was checked 18 August.

Results and Discussion

Twelve active pelican colonies located on nine different waterbodies were surveyed in 1980. Quill, Suggi and Primrose Lakes each contained two nesting islands. The total was 15,427 nests (Table 1). This is an increase of 3,148 nests or 26% over the 12,279 nests recorded in 1978.[1] All colonies maintained or increased their numbers with the exception of the Kazan Lake colony which decreased from 952 nests to 768 nests.

The Old Wives Lake colony remained stable while Lavallée and Primrose Lake colonies showed moderate increases of 771 and 827 nests respectively and Redberry, Quill and Suggi Lakes experienced sharp increases in colony size of 96, 423, and 839 nests respectively. Even though the latter increases appear less dramatic than for the Lavallée and Primrose Lake colonies, the actual percentage and relative increase in the size of these colonies was greater. Lavellée Lake colony increased by 26% and Primrose Lake colony by 21% while Redberry Lake colony increased by 133%, Quill Lake by 182%, and Suggi Lake by 92%. Kazan Lake colony decreased by 19%.

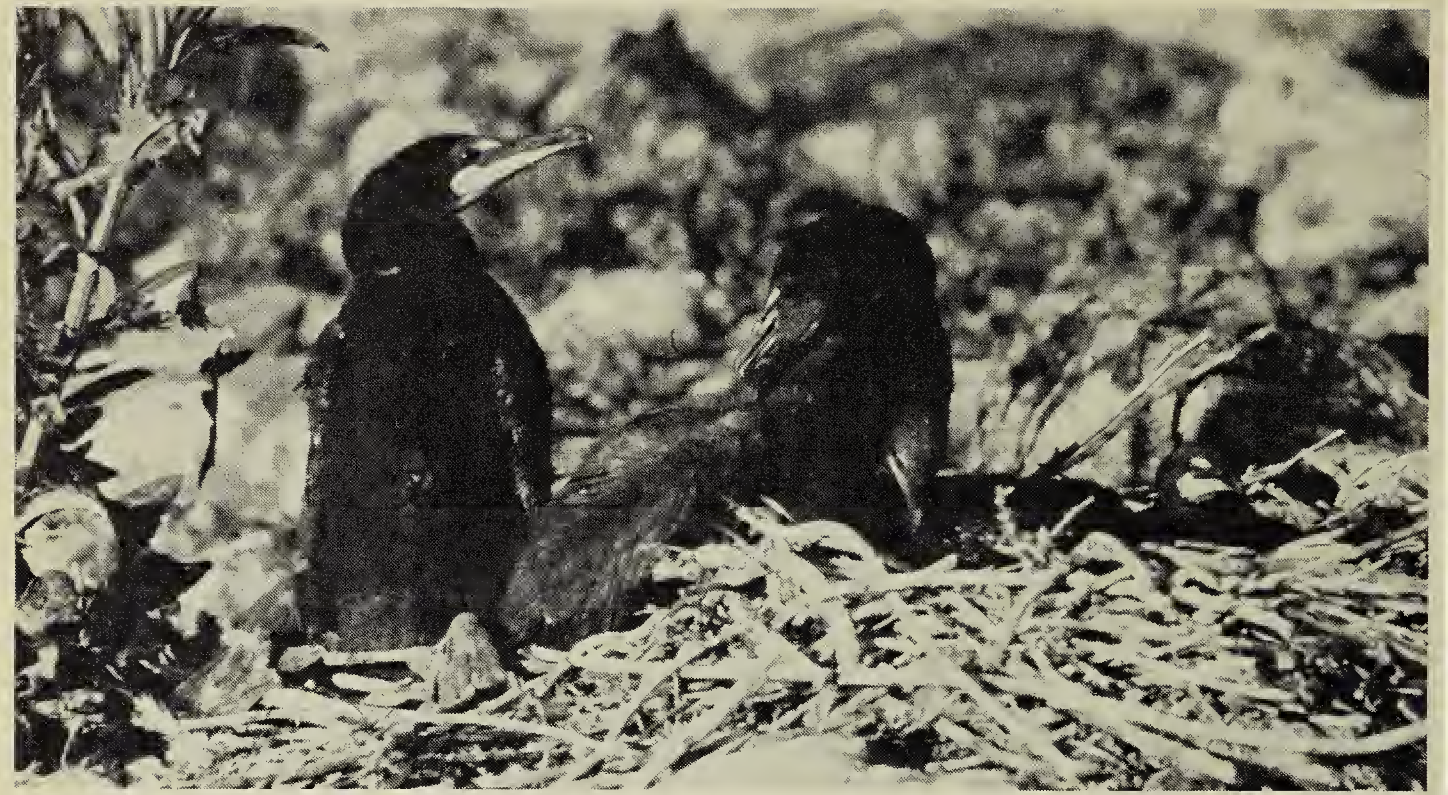
The colonies at Preston and Lenore Lakes were first surveyed in 1980. Although only recently reported and checked, these colonies have been in existence for a number of years. In 1935, Mr. S. C. Ells, a geologist with the Geological Survey, studied and photographed a colony of about 150 adult

Table 1. CENSUS OF PELICAN AND CORMORANT COLONIES IN SASKATCHEWAN, 1980

Location	*Date*	*Pelican Nests*	*Cormorant Nests*
Preston Lake[a]	May 18	275	—
Old Wives Lake	May 30	3,075	693
Last Mountain Lake	May 31	—	789 (2)[d]
Quill Lake	May 31	655 (2)	75 (2)
Cypress Lake[b]	June 2	—	283
Redberry Lake	June 4	168	43
Lenore Lake[c]	June 4	110	670
Suggi Lake	June 5	1,752 (2)	1,153 (2)
Lavallée Lake	June 6	3,790	747
Doré Lake	June 6	—	849 (2)
Primrose Lake	June 7	4,834 (2)	459 (2)
Kazan Lake	June 7	768	1,587
Churchill Lake	June 7	—	—
Reed Lake[c]	Aug. 18	—	62

a — Surveyed by C.W.S.
b — Ground survey
c — First surveyed in 1980
d — Indicates number of nesting islands, if more than one

Pelican/cormorant colony, Quill Lakes. *Keith Roney*



Double-crested Cormorants. *Juhachi Asai*

pelicans on an island in Preston Lake (W. E. Godfrey, pers. comm.). Residents in the vicinity of Lenore Lake indicated that this colony had been active for many years (D. Mevel, pers. comm.).

Seventeen active cormorant colonies located on twelve different water-bodies were surveyed in 1980. Two nesting islands were located on each of Last Mountain, Quill, Suggi, Doré and Primrose Lakes. The count was 7,410 nests (Table 1). This is an increase of 3,443 nests or 87% over 1978.[1] Old Wives and Quill Lake colonies remained stable while a moderate increase of 15% occurred on Lavallée Lake. Increases of 134% occurred in Last Mountain Lake, 79% in Redberry, 99% in Suggi, 214% in Doré, 270% in Primrose and 111% in Kazan Lake. The Cypress Lake colony declined by 28% and the Churchill Lake colony which contained 104 nests in 1978 was deserted in 1980.

Lenore Lake was first surveyed in 1980. A cormorant colony at Reed Lake was reported late in the summer (C. Harris, pers. comm.) and 62 nests were counted on 18 August.

The numbers of White Pelican and Double-crested Cormorant nests have been increasing since the monitoring program began in 1976. Local colony production and/or recruitment from other colonies have been sufficient to replace any losses. The total increase may be due to increased management and monitoring of these species. There is also increasing awareness of and concern for native wildlife by the general public.

Acknowledgments

I wish to thank Bill Russon for his assistance with the field census. I am grateful to Mr. Bruce Wilson, Superintendent, Prince Albert National Park, and the Department of National Defence, Medley, Alberta for granting permission to survey the Lavallée Lake and Primrose Lake colonies, respectively. Thanks are also extended to the many capable pilots involved in the aerial census.

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CROW PREDATES MALLARD DUCKLING

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On 15 July 1981 at approximately 1000 hours, I approached a pond 7 km WNW of Meacham, Sask. On stopping the vehicle, I noticed a Mallard hen with four ducklings about 15 m to my left. The hen commenced injury feigning behaviour while the ducklings swam to cover in emergent vegetation about 5 m distant. I was recording this brood count when I noticed a Common Crow flying along the water into the bulrush (*Scirpus*) where the ducklings were hiding. The crow seized a duckling by the neck with its beak and immediately the hen ceased its feigning and flew at the crow. This did not, however, interfere with the crow's visibly labored flight to a point on the ground about 30 m away (Figure 1). I went towards the crow and it abandoned the duckling. The skin had been torn away from around the duckling's neck and the bird died within a few minutes.

The duckling weighed 95 gm and measured 22 cm in length. Plumage characteristics corresponded to an age of about 16 days.[2]

Crow predation on ducklings is not considered to be a serious problem except locally and under atypical conditions.[3] The work of Bennett showed that crow predation on ducklings increased as drought conditions became more severe.[1] Water levels on my study area were the lowest in many years. This, combined with the associated reduction in cover, could have been a contributing factor to the predation observed.

In a study of crow stomach contents, Sowls found no duckling remains in 66 adults but they were present in 4 of 55 nestlings.[5] Kalmbach found duckling remains in 3 of 43 nestlings.[4] A crow's nest in good repair and three fledgling juveniles were discovered within 70 m of the predation site. It is probably that this predation was the result not only of human disturbance but also of increased food demand by the young on the parental birds.

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Mallard duckling. *J. B. Gollop*

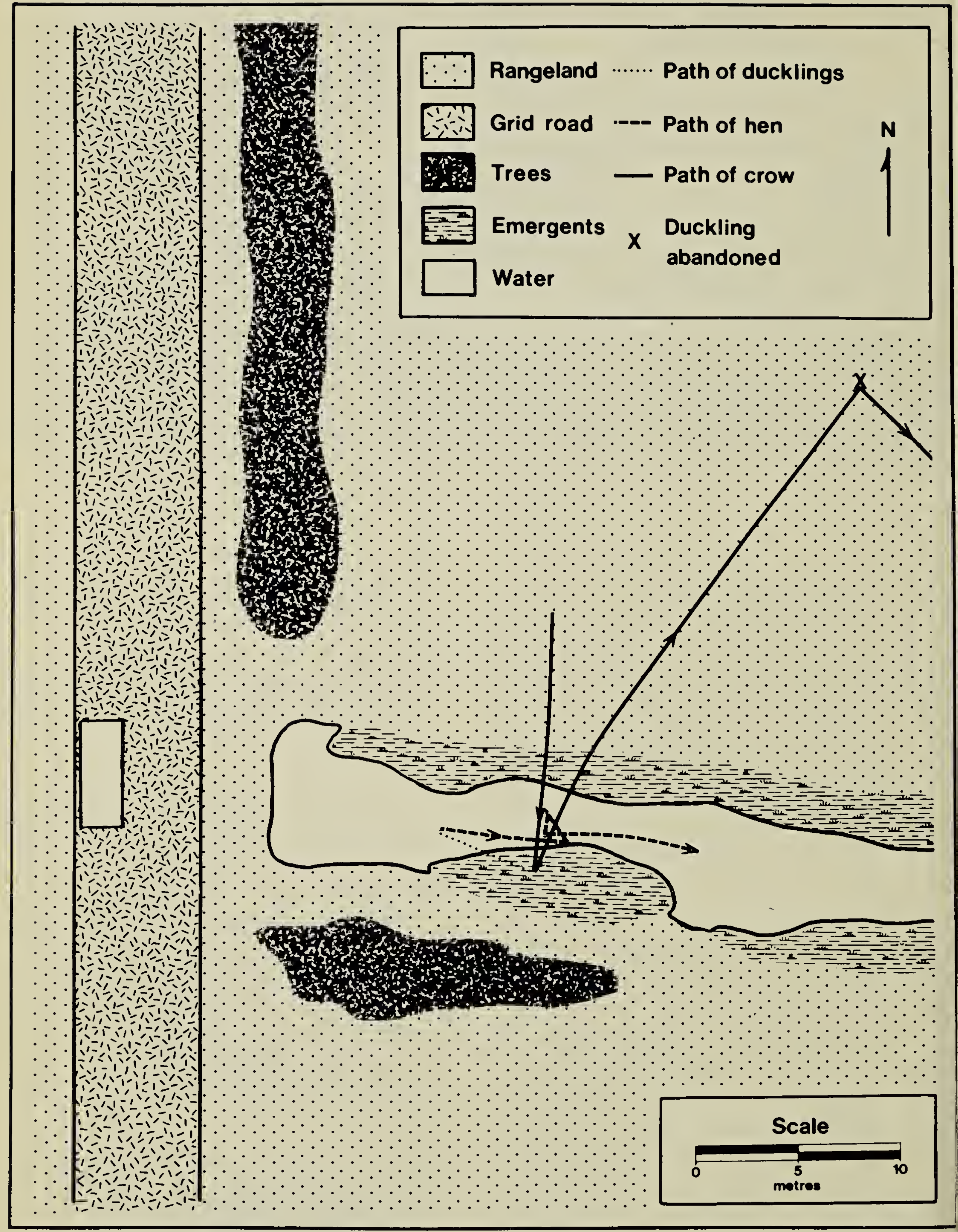

Figure 1. Movements of Common Crow, Mallard hen and ducklings.

CATTLE EGRET NEST RECORD FOR SASKATCHEWAN

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During an aerial survey of Old Wives Lake (ca. 40 km southwest of Moose Jaw) on 9 June 1981 aerial photos were taken of the White Pelican and Double-crested Cormorant colony and the adjacent Great Blue Heron and Black-crowned Night Heron colony. Later examination of the photos showed that a white bird was present within the heronry.

On 30 June, Bill Russon and I collected food samples from the young pelicans and cormorants on that island. While there, we visited the heronry to check on the white bird that was evident in the photos. The heronry was in a small clump of aspen trees. When we approached the aspen grove a white heron-like bird flushed and circled overhead. It had buff patches on its head, breast, and back, yellowish bill and legs and a relatively small body size. These characteristics identified it as a Cattle Egret. We entered the heronry, occupied by nesting Great Blue and Black-crowned Night Herons, and spotted another egret sitting on a nest. The nest of sticks and twigs was placed ca. 5.5 m (18') above ground in an aspen. As we neared, the egret stood up on the nest's edge and then flew. I climbed the tree. The nest contained three very pale blue (almost white), unmarked eggs. They were short-oval to almost elliptical in shape and had a smooth, dull finish.

To further verify the find, one egg was taken from the nest and subsequently photographed and measured. The measurements were 43.5 mm x 34.0 mm (see accompanying photo). The egg has been incorporated into the Saskatchewan Museum of Natural History's egg collection (Acc. No. 4049).

On subsequent visits to the island in connection with the food study (up to and including 14 July), the egrets were observed either flying around the island or sitting on the nest.

The cattle egret, indigenous to the Old World, was first recorded in Canada off the Grand Banks of Newfoundland in the fall of 1952.[2] The first nest record for Canada was on 4 June 1962 at Luther Marsh, Wellington County, Ontario.[1] On 14-17 June 1974, Hugh Hedger reported the first sightings of Cattle Egrets in Saskatchewan at the Nis'ku Goose Project near Eyebrow.[4] By 1978, there were six reported sightings of the Cattle Egret in Saskatchewan.[3] The nest record reported here is the first for Saskatchewan. With its apparent continuing range extension, more nest records will undoubtedly be found for the province in the near future.

Cattle Egret egg. *Keith Roney*

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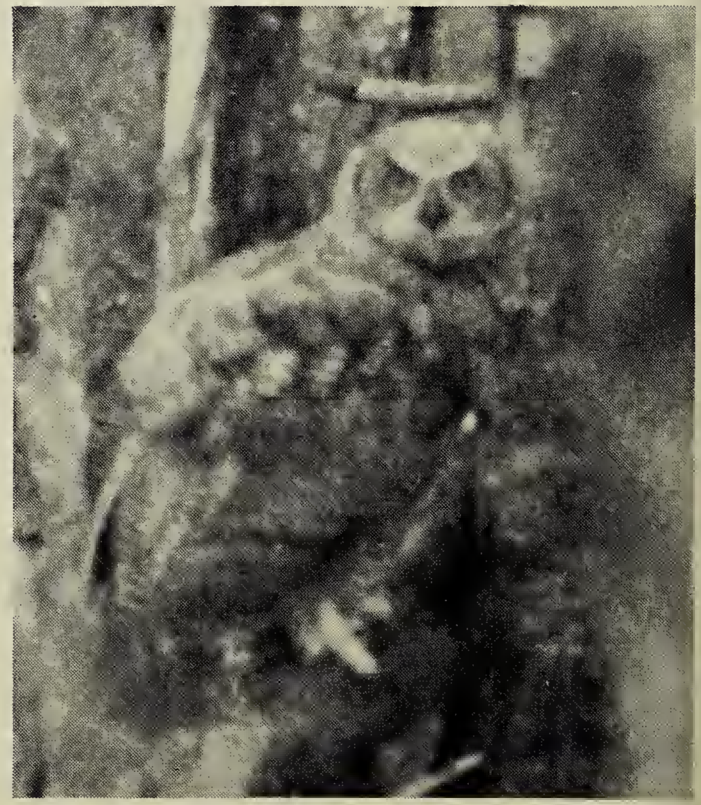
THE GREAT GRAY OWLS THAT WEREN'T

C. STUART HOUSTON, 863 University Drive, Saskatoon, Saskatchewan, S7N 0J8, CHRISTOPHER J. ESCOTT, 271 Sylvian Way, Saskatoon, Saskatchewan, S7H 5G1 and ROBERT C. GODWIN, 313 McMaster Crescent, Saskatoon, Saskatchewan. S7H 4E5

On 22 July 1982 at 2200 Houston received a phone call from Doug Sadler reporting three or four hornless, earless, large owls sitting on poles near his farm home 10 mi. south of Saskatoon. Sadler had earlier seen one of these owls in daylight and noted the yellow eyes that excluded the possibility of Barred Owls, for which there is only one nest record in Saskatchewan. Instead, Sadler felt these must be juvenile Great Gray Owls, for which there are only two, possibly three, documented nest records for the province. Since even at this latitude it was already pitch dark, we arranged to meet at Sadler's farm the following evening at 2000. By that time Marc Bechard would have arrived from Huntington, West Virginia, for a weekend of Swainson's Hawk banding.

On 23 July, joined by Bechard, Mary Houston, Kelly Wylie, and Chris Escott, Sadler and the five of us searched the small aspen "bluffs" where the owls had been seen the previous evening. After two hours without success, just before 2200, we heard the plaintive calls of the hungry young owls. Their call was, to our ears, exactly the same as the call of the young Great Gray Owl on Roger Tory Peterson's *Field Guide to the Western Birds* song album to which we had listened at supper time. We followed the calls for a quarter mile and obtained good silhouettes against the night sky of very large owls with smooth hornless heads. We weren't sure the heads were large enough for Great Gray



Young Great Horned Owl. *Chris Escott*

Owls. The head and neck seemed arched or stooped after the manner of some paintings of Barred Owls. The owls were "spooky" and wouldn't allow a near approach, quite different from the normally absurdly tame Great Grays. We chased the owls from bluff to bluff, all the time following the presumed hunger calls of the three young.

After 90 minutes of this it was pitch dark, and the owls were calling from a larger bluff across from Sadler's, so we tried putting out a Bal-chatri trap containing two mice, hoping to lure them in for capture and definite identification. We had no luck and returned home by midnight.

Back home, we again listened to the Peterson record, confirming the similarity of the calls with that of the Great Gray. Although it was now 0100 in Winnipeg, Houston phoned Bob Nero and routed him out of bed to ply him with questions. Having visited over 1500 nests of Great Horned Owls, having caught Horned Owl nestlings that had been out of the nest for two weeks or more on a number of occasions, by which time rudimentary "ears" were begining to appear, Houston had never heard this call from a Great Horned Owl. Nero assured Houston that Barred Owl young do not make such a noise. Nero felt that the aspen parkland habitat described to him was not unlike that around East Bay, Manitoba where Ed Robinson once had a nesting Great Gray Owl.

Nero assured Houston that, yes, Great Grays could land on fence posts, yes, they did not always allow a close approach, and yes, the three calling birds must be young that were raised nearby. Nero suggested that every hawk and crow nest within a half-mile or mile of the sighting be climbed in a search for confirmatory Great Gray Owl feathers.

The next day Houston, Bechard and Wylie went off to band the Swainson's hawks located by Jean Harris near Kindersley, while Escott returned with Jim Wedgwood to the scene of the crime. The lack of horns or ears and the yellow eyes were evident at close range in good light, and seemed to confirm the diagnosis of Great Gray Owl.

Responding to the Rare Bird Alert call, Stanley Shadick, Bob Godwin and Nigel Caulkett next appeared. Godwin was skeptical, for he had heard Great Horned Owls give the same peculiar short scream on five previous occasions at dusk, only in August and September, and only in the Great Sandhills near Tompkins and Cabri and along the Saskatchewan River near Fort a la Corne. One of the young owls was located, and watched while it gave the call. It was too light in colour for a Great Gray, and had tiny ear tufts barely visible. Godwin recorded the calls on tape for over 10 minutes, with one call about every 30 seconds.

Escott returned for a third time, on 27 July, and studied all three young. One was light in colour and two were dark. They had a wide V pattern on the forehead, the facial disk had two, not four, circular parallel lines, and the beak was dark and relatively small — all distinguishing features of young Great Horned Owls not shared by young Great Gray Owls. Escott obtained the photograph shown here.

Young Great Horned Owls are fed by their parents for about three months after they leave the nest, and during this time band recoveries show they usually stay within a few miles of the nest. But how many readers have heard this repetitive call of the Great Horned Owl, so like the hunger call of the young Great Gray? What times has it been heard and in what circumstances? Perhaps knowledge of this little known, persistent call of our commonest owl will help others to avoid making the same humiliating mistake that a number of us made.

TREES FOR CAVITY-DWELLING BIRDS

JEAN BANCROFT, 306-200 Tuxedo Avenue, Winnipeg, Manitoba. R3P 0R3

In our present society it seems to be the rule, rather than the exception, to remove standing dead and dying trees. Little do people realize the value of these trees for many species of birds for perching, roosting, and nesting in tree cavities. More importantly, cavity-dwelling birds perform a useful function in the balance of Nature by consuming insects.

For several years, during my walks in and around Whytewold on Lake Winnipeg (where our summer cottage is located), I have noticed that there are many standing dead and dying trees in private properties and wooded areas. These trees hold a particular fascination for me and I take great delight in watching to see what they might reveal.

Early every spring I hurry over to view a tall dying aspen poplar which has several cavities of various sizes in its trunk. The largest cavity has been occupied by Grey Squirrels from time to time. Several smaller ones have been the nesting sites of Starling, Hairy Woodpeckers, and Yellow-bellied Sapsuckers. In the spring of 1981 I observed a Downy Woodpecker hollow out a new cavitiy, and I have the good fortune of watching the entire nesting period.

On our property an aged giant oak has, in its gnarled base, a very large cavity made by Nature. From all appearances squirrels have made good use of this cavity during the winters. One summer I received a surprise when I discovered that a pair of white-breasted nuthatches had chosen to nest in it. Imagine my delight when, looking into this cavity through a shaft of light, I saw five nearly fledged young sitting upright in a row, all huddled together.

A standing dead ash had a family of Tree Swallows nesting in a small cavity for several seasons (until someone chopped the tree down.) A tall old poplar was used by a family of Tree Swallows for several seasons, until the property owners decided to cut down every poplar in their yard. I was present when Tree Swallows came back in the spring of 1981 to this same spot — (I assume it was the whole family from the previous summer, as there were six of them)[1] only to find that the nesting site had disappeared.

One spring a pair of Black-capped Chickadees decided to excavate a hole in the top of a broke-off dead tree situated in a Caragana hedge. It was with a good deal of interest that I watched the sawdust come flying out of the cavity as they worked.

One of my most interesting finds was a pair of American Kestrels in a broken-off standing dead poplar in woods near the creek. The first season, 1980, I was unable to locate the nest site until I spotted two recently fledged young sitting nearby in a broken-off tree. In 1981 I went back to the same spot on 30 May and, sure enough, American Kestrels had established a nest in the same cavity. (It probably was the pair from the previous season.) I observed the nest from time to time for 3 weeks, expecting any day that I would be able to see signs of the young. However, a tragedy occurred; one night a very severe windstorm split and felled the tree right at the nest cavity. The adult birds were flying overhead and making a tremendous noise with their calls of "*killy, killy, killy*." The nest and its contents had been destroyed by this act of Nature.

Near the railway tracks a small

woodlot borders a farmer's land; this contains many standing dead trees (mostly poplars.) It is a good spot to see many different species, including several varieties of woodpeckers. It is especially a favourite haunt of the Red-headed Woodpecker. Two consecutive seasons I observed these birds nesting in an old tree cavity.

Unnecessary tree-cutting continues, notwithstanding the valuable contribution made by cavity-dwellers. Scientific experiments made to provide a substitute for standing dead and dying trees appear to date to have been unsuccessful. A recent article in Audubon, by Roxanna Sayre, develops this point:

> "By now it is a familiar story. First the tree-cutters dispatch square miles of what they like to refer to as 'over-mature' trees — and leave cavity-nesting wildlife without homes. Then wildlife scientists step in and try to create housing for squirrels, mice, birds, even bears. Nest boxes, the traditional replacement housing, aren't very attractive or long-lasting, and are vulnerable to predation.
>
> "So a couple of U.S. Forest Service staffers in West Virginia decided to help nature provide the decaying trees in which nest holes develop. They cut live branches from healthy oaks and maples and injected them with fungal infection to induce decay. This worked — but very slowly. And it provided homes, but mainly for flying squirrels and a few white-footed mice."

Researchers then decided to use polystyrene and plant plastic trees in a forest infested with spruce budworm.

> "The managed area had been denuded of good nesting trees and zoologists were trying to lure woodpeckers back to the area to help subdue the plague of budworms. Holes were dug out in most of the trees but no woodpeckers nested. Apparently males couldn't attract females by tapping on the plastic trees because they would not resonate. The scientists now plan to sheath a portion of their phony trees in real plywood."[2]

From the foregoing, and from the instances I have observed, it is evident that it is of the utmost importance that natural habitat be retained for cavity-dwelling birds. Let us become more aware of this and take a greater interest in its protection and management.

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[1] PINEL, H. W. 1980. Reproductive efficiency and site attachment of Tree Swallows and Mountain Bluebirds. Blue Jay 38(3): 181 and 183.

[2] SAYRE, ROXANNA. 1981. Creatures. Audubon 83(4): 24. Reprinted with permission from Audubon, the magazine of the National Audubon Society.

GREAT BLUE HERON CONCENTRATIONS

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On 17 May 1982, Joe O'Connor and I sighted two large flocks of Great Blue Herons feeding on dry ground. Both of us are familiar with Sandhill Cranes and are certain of the identification. Approximately 40 to 50 birds were in each flock, feeding in open fields near Powderhorn Creek, southeast of Homebrook off PR 328 and near Lake Manitoba. The fields in which the birds were feeding were used for haying and/or pasture. The flocks were within about a quarter mile of each other. The sighting was made about 1300 hours. The weather at the time was overcast, with light intermittent drizzle.

The flocks were fairly tightly knit, with several feet between individuals. They were intent on feeding and were not disturbed by the sounding of the vehicle horn.

According to William H. "Bill" Koonz, the nearest known Great Blue Heron rookeries are all about 20 miles away.

YELLOW-BELLIED SAPSUCKERS

CAROL C. CLARKE, R.R. No.1,
McKague, Saskatchewan. S0E 0Z0

Our farm is located in east-central Saskatchewan. Several varieties of deciduous trees and spruce remain to provide an excellent habitat for wildlife. With increased utilization of land for agriculture in the surrounding areas, more species migrate to our woodlots. We provide them with protection and aid: winter feed stations, bird houses, water, hunter and cat control. They, in turn, offer us much enjoyment. Among some events, we have rescued a woodchuck from an unused water trough, discovered a beaver on our doorstep and visited a white-tailed doe and her triplets.

Families of Yellow-Bellied Sapsuckers have nested in various locations on the farm. This species of woodpecker drills tiny holes in parallel rows on live trees to make the sap run. They return later to feed upon the sap and the small insects attracted by the sap flow. The first invasion was in the autumn when a single bird started drilling our apple trees. Since the apples are not very hardy, we waxed the holes and covered the trunks to discourage the bird. It was also late in the season so possibly the sap was not running as well as expected or the bird may have migrated south. The damage did however, encourage insect pests the following season.

Last June (1981) a family of sapsuckers nested in a hole in a large live aspen in the barnyard. The parents arrived to attack our silver willows causing extensive damage to the one-inch trunks. Nothing seemed to disrupt their progress and they became very possessive of their trees. This corner happened to be a very busy one with garden cultivating, lawn mowing, greenhouse activities, plus watering the horses daily caused traffic through the hedge. However, undaunted, the birds soon had the sap bubbling and frothing out of the willows.

In the hot days of August the brewery-like stench was nauseous. This seems to delight the fledglings. The family was soon "sipping the brew". Disastrous results of their intoxicated condition were apparent rather quickly. One male fledgling collided with the side of the house breaking his neck. A second bird was observed flying in a peculiar circular fashion high above the maples. Suddenly, it "nose-dived" straight down into the bushes. We were unable to determine whether it crash-landed or survived the dive. The remaining two (or three) were more bold and less afraid of intruders, people or cats. As silver willows are not very tall shrubs, a constant surveillance of one cat became necessary. I was able to photograph the birds at very close range.

The smell of the fermenting sap attracted other visitors. The most interesting was a family of Ruby-throated Hummingbirds. The sap seemed to affect their usually cautious natures as well as their flight patterns. I was able to approach them very closely. Only one, once it spotted me, became excited and tried to remove the others who largely ignored it. One bird swooped over me while I sat on the lawn and flew almost through my hair. They also squealed more than when they visited the flower beds. The increased vocalization interested the cat, of course.

Insects also indulged in the sap. One group of large flies, which I did not identify, were constantly at the willows. Hosing them with water removed the flies, but, as the sap flowed rapidly, they returned almost immediately.

I was able to photograph several butterflies that were guests of the sapsuckers. First the White Admirals, who normally feed upon aphid honeydew and liquids from carrion and flowers, came in groups. The Red Admirals which usually feed from fruits and flowers were also plentiful. The Gray Comma, who is fond of sap, rotting fruit, carrion and scat as well as a diet of flower nectars, was not observed as commonly as the admirals. There were some Mourning Cloaks and possibly a Large Wood Nymph which is a sap sipper. I was unable to positively identify the nymph.

Hopefully our silver willows have survived the winter regardless of their damaged condition. Although our less hardy shrubs were not invaded there may be more insect pests in the area next season due to the willows. This incident provided us with an interesting encounter with nature, but I would not recommend the procedure as a method of baiting wildlife for nature photographers.

PYLE, R. M. 1981. The Audubon Society Field Guide to North American Butterflies. A. A. Knopf, New York. 916 pp.

White Admiral at sapsucker drains. *Carol Clarke*

BAND-TAILED PIGEON NEAR HERBERT, SASKATCHEWAN

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Avenue, Saskatoon, Saskatchewan.
S7J 2G9

On 21 June 1981 three friends and I were visiting relatives north of Herbert. We decided to take a walk to a nearby abandoned schoolyard known as the Coxley School. As we approached the hedgerow surrounding the school one of my friends spotted a bird that flushed from the Caraganas. It flew across the schoolyard and landed in a tree. My first impression as the bird flew was that it was a Rock Dove, however something didn't appear quite right. I viewed the bird through 7x35 binoculars at about 100 meters. It was facing me, revealing a large brownish breast and a yellow bill. It was at this time that I suspected I was looking at a Band-tailed Pigeon. Not being familiar with this species I attempted to get closer for a better look. The pigeon was very timid and flew to another Caragana hedgerow. After several glimpses of the bird it finally landed on a barbed wire fence about 20 m in front of me. The view this time was from the rear and to one side. The white neck band and yellow bill with a black tip were easily seen.[2] When the pigeon flew the broad gray tail band was evident.

I left the schoolyard and returned 10 minutes later to attempt a photograph. The bird was still very shy and only glimpses of it were seen as it flushed from hedgerow to hedgerow. It finally flew across a stubble field to a farm yard approximatley 2 km to the west and was not seen again.

When I returned to Regina later that day I reported the sighting to several people in Regina. As a result Fred Lahrman drove to Herbert on 22 June but was unable to locate the bird.

According to Salt and Salt the Band-tailed Pigeon is easily mistaken for its domesticated relative but the Band-tailed is a woodland species and is more likely to be found perching in trees than the Domestic Pigeon.[3]

There are three previous records of sightings of the Band-tailed Pigeon in Saskatchewan: 6 August 1970 at Valley Centre near Rosetown by Wayne and Don Renauld, in Saskatoon on 30 September 1970 by Shelagh Aldous, and 28-29 June 1980 near Mortlach by B. Forbes.[1]

[1] HOUSTON, C. S., M. I. HOUSTON and J. B. GOLLOP. 1981. Saskatchewan Bird Species — Hypothetical and Rejected. Blue Jay 39(4): 196-201.

[2] ROBBINS, C. S., B. BRUUN, H.S. ZIM and A. SINGER. 1966. Birds of North America. Golden Press, New York. 340 pp.

[3] SALT, W. R., and J. R. SALT. 1976. The birds of Alberta. Hurtig, Edmonton. 498 pp.

EFFECTS OF A LATE MAY BLIZZARD

AUSTIN FORSYTH, Apt. 197, 325 - 5th Ave., Saskatoon, Saskatchewan. S7K 2P7

The morning of 29 May 1982 dawned rather hesitantly to reveal a record breaking ten cm of wet snow around our Pike Lake cabin. After locating a recently retired parka and boots, I set out on a tour of inspection, and found that the unseasonable weather was playing havoc with some of our resident birds.

Clumps of ten foot high berry bushes on the back slope had been flattened by the weight of the snow, and three pairs of Yellow Warblers who had nested in them were darting back and forth in complete confusion. Two pairs of robins seemed equally upset. I knew that the nest of one pair was in the fork of a poplar that was still upright, but now it was filled to the top with slush. This disrupted occupancy of nests seemed to increase the number of visiting magpies, and we have since found an unusual number of punctured eggs on the ground.

It was interesting to watch the behaviour of half a dozen Red-winged Blackbirds who had established territorial claims along the reed covered lakefront. These noisy neighbors had been following their usual springtime pattern, with the males arriving about a week before their drab brown mates. In the interval they had flown hundreds of flashy forays to protect their claims, but for several days before the storm there had been relative peace on the waterfront. The late snowfall had evidently upset this pattern, for they went back to squabbling over their territories as though their biological clock had been set back a couple of weeks. It was at least two days before the status quo was re-established.

Veeries are common in the aspen forest that surrounds us, but seldom do they spend much time in our clearing. The snow must have interfered with their normal feeding, because that morning I counted ten of them pecking for worms in the small flower bed on the lee side of the cabin. When the snow melted we found four dead.

Most disturbing of all was the plight of hundreds of Tree Swallows who had been darting gracefully in the sky over the lake following an abundant first hatch of mosquitoes and gnats. One pair had leased the bird box that Reg Plumb has provided for our front yard, and all seemed to be going well with their nesting procedure; then came the snow, which continued intermittently for most of the day. At the top of the hill dozens of swallows were flying only a few feet from the ground, their wings heavy, and their food supply washed from the sky. Hopefully some of them made their way north westward where the storm was less severe, but I suspect that their local population has been severely depleted. Sightings to mid June in our neighborhood are almost non-existent. Even a lush new crop of mosquitoes has not brought them back, and our swallow house is vacant for the first time in eight seasons.

MUSEUM PROGRAM REQUIRES INFORMATION

The Saskatchewan Museum of Natural History is setting up a system for recording sightings and locations of all Saskatchewan flora and fauna. These data will help the Museum determine the distribution and habitat of plants and animals in the province. To increase the accuracy of these records, the Museum is seeking the assistance of the public in obtaining this information.

Of primary interest are phenomena such as snake hibernacula, bird nesting locations, concentrations of fossils, populations of turtles, breeding concentrations of amphibians, sights of rare or unusual mammals or plants and bird migration dates and locations.

Any information on plants or animals which will contribute to the knowledge of range and habitat are also welcome. Even sightings within the normal range of a species will provide information on precise locations and habitat requirements. All reports must contain date, time of day, exact location, observer's name, and any other pertinent information.

Anyone who is interested is invited to participate. Reports should be sent to the Life Sciences Unit, Saskatchewan Museum of Natural History, Wascana Park, Regina S4P 3V7.

JUNIOR NATURALISTS

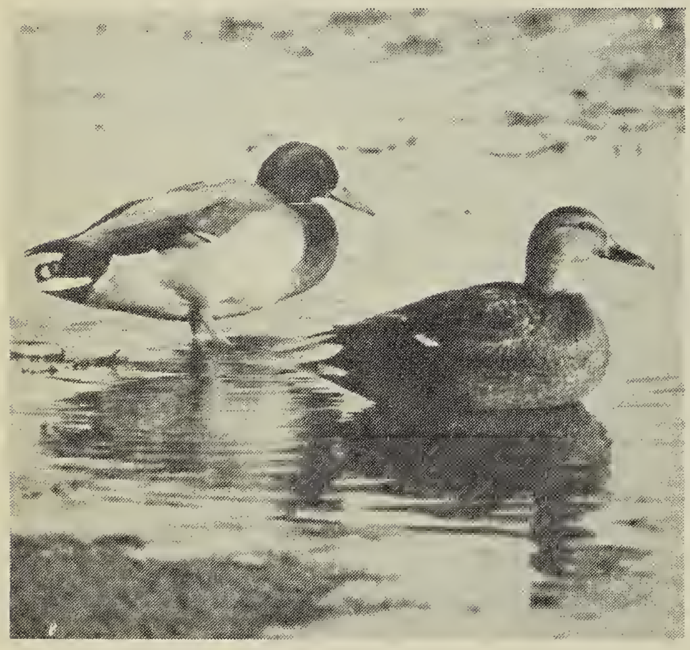
BIRD IDENTIFICATION

Last year we asked junior naturalists to submit photographs in a photo contest. This year we are supplying the photographs and asking you to identify the birds in the photographs. They are all birds that are common in most areas of Saskatchewan.

To be eligible you must be under 16 years old. Your entry should identify the photos by their number and give your name, address, age, the school that you attend and the grade you are in at school.

A draw will be made from the best entries and a guide to bird identification awarded to the winner. To encourage teachers to have their entire class enter, a similar guide will be given to the best class entry (send entries from one class all together in one envelope). Winners will be announced in the December issue.

Send all entries in by 1 November 1982 to *Paule B. Hjertaas*, 919 Cook Crescent, Regina, Saskatchewan. S4X 2L9



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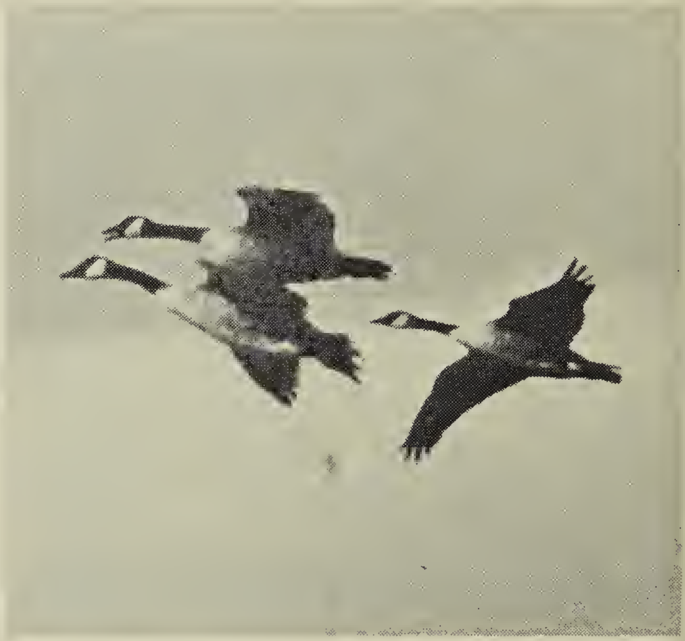

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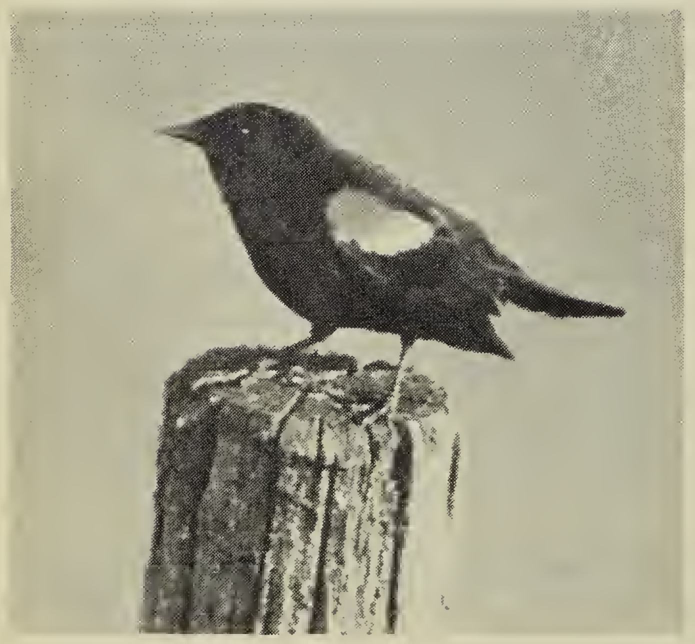

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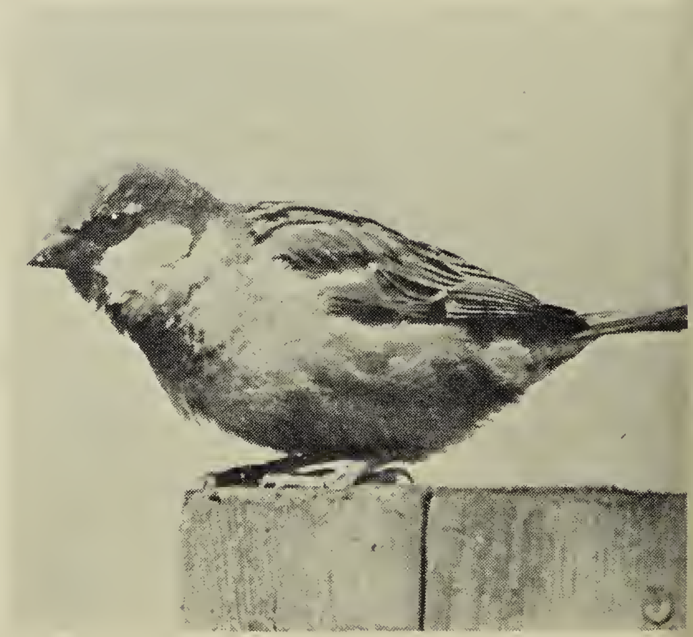

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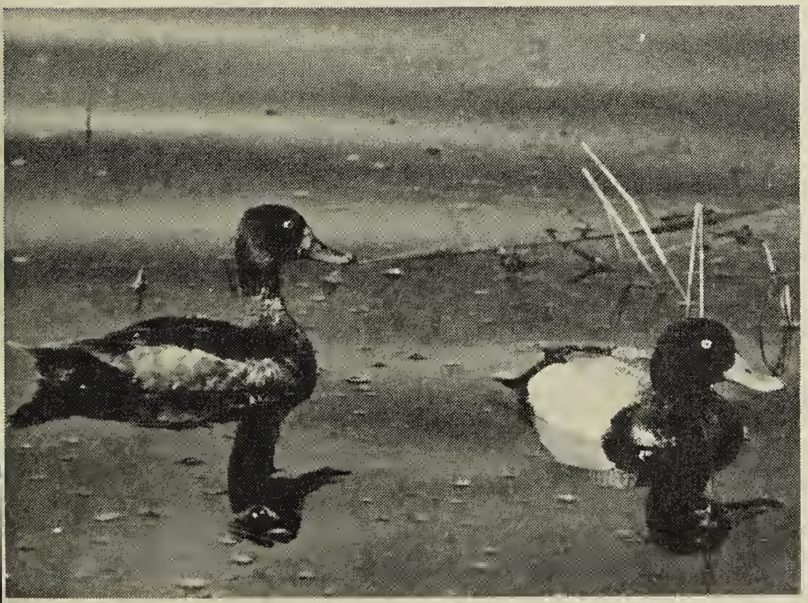

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NATURE LIBRARY

SOME ADAPTATIONS OF MARSH-NESTING BLACKBIRDS

GORDON H. ORIANS. 1980.
Monographs in Population Biology No. 14, Princeton University Press, Princeton, New Jersey. Pp xii + 295, illus., 16 appendices. Cloth $18.00 U.S., paper $7.95 U.S.

If you are interested in marsh passerines, blackbirds, or ecological theory you should read this book. The author studied marsh blackbrids in North America and Argentina to test ecological theories on habitat selection, foraging behaviour, and mate selection.

The author says his studies have led him to view marshes as "factories producing food and providing nest sites for blackbirds." He begins the book by discussing marshes as providers of resources. This introduction is valuable in understanding the problems faced by Red-winged, Yellow-headed, and Brewer's Blackbrids and their responses to these problems.

While reading the book I learned the explanation for some of my own casual observations. When I was in high school I was puzzled by the restriction of Yellow-headed Blackbirds near our farm to one slough while the Red-winged Blackbirds nested at every slough. The Yellowheads only expanded their distribution for two years at the peak of a wet cycle. Now I know why. Yellow-headed Blackbirds choose only habitats with large emergences of aquatic insects, especially dragonflies and damselflies. These insects have large emergences on permanent marshes and were less abundant in the temporary sloughs at the farm.

While this book contains large quantities of information on blackbirds I found the discussions of optimal foraging and other theory most interesting. Orians uses his study to provide tests of theory when possible. He also uses theory to gain insights into blackbird behaviour and to pose new questions for study. I found this use of theory stimulating, giving me new insights into the activities of birds I watch.

The discussion of theory will be helpful to students of foraging, habitat selection, and mate selection even though many of the tests failed to conclusively prove or disprove the hypothesis.

The text is clear. The author uses many tables and graphs but some of these are difficult to understand.

Imust add a word of warning. This book reports a scientific study and is not an easy reading natural history book. While the theory is well explained a few moments of thought are often necessary to understand the concepts. I therefore recommend *Some Adaptations of Marsh-Nesting Blackbirds* to those of you with special interests in blackbirds or ecological theory or who wish to read some ecological theory to gain new insights into bird behaviour. — Reviewed by *Dale G. Hjertaas*, 919 Cook Crescent, Regina, Saskatchewan. S4X 2L9

THE HISTORY OF THE FEDERATION OF ALBERTA NATURALISTS AND ITS CORPORATE MEMBER CLUBS

Special Issue No. 1, Alberta Naturalist, July 1981. Federation of Alberta Naturalists, Box 1472, Edmonton, Alberta. T5J 2N5. 152 pp. Price $6.00 plus $1.00 postage.

Thirty-two authors have contributed to this interesting publication, one of two edited by the prolific and indefatigable Martin K. McNicholl, and produced in time for the August 1981 meeting of the American Ornithologists' Union in Edmonton. This special bulletin is dedicated to the late Helen Schuler, the first treasurer of the Federation of Alberta Naturalists (FAN), and the daughter of the late Steve A. Mann of Skull Creek, Saskatchewan, who himself was a past-president of the Saskatchewan Natural History Society.

David A. E. Spalding was contributed a tantalizingly brief overview of the history of Alberta naturalists (15 pages) and John M. Powell has written 15 pages on the history of the FAN itself. There are 42 pages about constituent societies, 45 pages about the officers, editors and patrons of the FAN, and 15 pages of appendices. Perhaps most valuable are the "critical reflections" of M. Tim Myres telling of the achievements, failures and problems of he FAN, since sister organizations share the same dependence on a few dedicated individuals and since some of he shortcomings are similarly shared. Myres makes thought-provoking comments about the dangers of "commercial secrecy" of some contract studies, and is "always saddened when graduate students haven't the time to belong to the local naturalists' organization".

It might seem presumptuous to publish a history of an organization only ten years old, but actually Spalding's account begins two centuries ago. Some of the material would have been difficult to obtain in another 20 years. In spite of some inevitable overlap and repetition between accounts of individuals and societies, telling of identical events from slightly different viewpoints, it is all interesting to read and worthwhile to have on record. The cover is graced by a charming Edgar T. Jones sketch of Alberta's provincial bird emblem, the Great Horned Owl. — Reviewed by *C. Stuart Houston*, 863 University Drive, Saskatoon, Saskatchewan. S7N 0J8

BIRD BANDING IN ALBERTA

Special Issue No. 2, Alberta Naturalist. August 1981. Federation of Alberta Naturalists, Box 1472, Edmonton, Alberta. T5J 2N5. 73 pp. Price $3.00 plus $.50 postage.

This bulletin is dedicated to the memory of the late Ken Trann, an avid bird bander, teacher and conservationist, who died of leukemia at age 36. A sketch of a nestling Great Horned Owl by Edgar T. Jones graces the cover.

This does not pretend to be a definitive or comprehensive account of bird banding in Alberta. There is an overview of banding by the editor, Martin K. McNicholl, who devotes only one paragraph to waterfowl although more waterfowl have been banded than all other species of birds combined. The work of Ken Trann and that of Edgar T. Jones is featured. There are reprints of three interesting articles from 1928, 1939 and 1940, respectively: William Rowan's "Scientific Aspects of Bird Banding" from the *Bulletin of the Northeastern Bird Banding Association*, W. Ray Salt's "Notes on Recoveries of Banded Ferruginous Rough-legged Hawks" from *Bird Banding*, and "Bird Banding is Hobby of Alberta Housewife" (Kathleen Salt) from the *Family Herald and Weekly Star*. Included also are more recent studies on Merlin banding at Edmonton by Alan R. Smith, Tree Swallow and Mountain Bluebird banding by Donald J. Stiles, Ring-billed Gull movements by Chip Weseloh, sex ratio in American Dippers by David M. Ealey, the number of Black-capped Chickadees at a field station by Martin McNicholl, Peregrine Falcon reintroductions by Allen N. Wiseley, and an impressive account of the number of raptors banded in the western provinces, North-west Territories and the Yukon, by Richard Fyfe and Ursula Banasch. Unfortunately the latter gives no breakdown as to numbers banded in Alberta versus other areas. Only for the Ferruginous Hawk is there a map of out-of-province recoveries and this has not been up-dated since Salt's 1939 publication. The thorough bibliographies are useful. In summary this is an interesting though random selection of what banders have accomplished in Alberta. — Reviewed by *C. Stuart Houston*, 863 University Drive, Saskatoon, Saskatchewan. S7N 0J8

Muskrat. *Gary W. Seib*

SASKATCHEWAN NATURAL HISTORY SOCIETY
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